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TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1898.

PART I.

BOSTON:
PRINTED FOR THE SOCIETY.
1899.

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ERRATUM.

On page 145 March 12 should be March 19.

The following lectures have been circulated to some extent in the form of slips reprinted from the reports made by the Secretary of the Society in the "Boston Evening Transcript." As here presented, the lectures are printed in full, and reports of the discussions following the lectures are added, these, where it appeared necessary, having been carefully revised by the speakers.

The Committee on Lectures and Publication take this opportunity to repeat what they have before stated, that the Society is not to be held responsible for the certainty of the statements, the correctness of the opinions, or the accuracy of the nomenclature, in the lectures and discussions now or heretofore published, all of which must rest on the credit or judgment of the respective writers or speakers, the Society undertaking only to present these papers and discussions, or the substance of them, correctly.

B. M. WATSON,
J. H. BOWDITCH,
AARON LOW,
Committee on Lectures and Publication.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, January 1, 1898.

A duly notified stated meeting of the Society was holden at eleven o'clock today, the President, FRANCIS H. APPLETON, in the chair.

In the absence of the Secretary, by reason of illness, the President appointed Miss C. M. Endicott Secretary *pro tem.*

The following appropriations, recommended by the Executive Committee at the meeting on the sixth of November, came up for final action, and were unanimously voted, viz.:

For Prizes and Gratuities:	
For Plants for the year 1898	$2,000
For Fruits " "	1,732
For Flowers " "	2,668
For Vegetables " "	1,200
For Gardens, etc. " "	500
Total	$8,100

The President, as Chairman of the Executive Committee, reported a recommendation that the Society make the following further appropriations for the year 1898:

For the Committee on Lectures and Publication, this sum to include the income of $50 from the John Lewis Russell Fund	$300
For the Committee of Arrangements, this sum to cover all extraordinary expenses of said Committee . .	400

For the Committee on the Library, for the purchase of magazines and newspapers, binding of books, and incidental expenses of said Committee . . .	$400
For the Committee on School Gardens and Children's Herbariums, this sum to cover all incidental expenses of the Committee, and to be paid through the usual channels	250
For the salaries of the Secretary and Librarian and the Treasurer and Superintendent of the Building . .	3,000

These appropriations were unanimously voted.

The President reported the appointment by the Executive Committee of Charles E. Richardson as Treasurer and Superintendent of the Building, and Robert Manning as Secretary and Librarian, for the year 1898.

Professor Benjamin M. Watson, Chairman of the Committee on Lectures and Publication, announced that the Programme of Lectures for the season of 1898 had been printed and distributed to members, and expressed the gratitude of the Committee to the retiring Chairman, Mr. J. D. W. French, who had served so long on that Committee, for his assistance in preparing the present course of lectures.

E. W. Wood, Delegate to the State Board of Agriculture, presented his Annual Report, which was referred, without reading, to the Committee on Publication.

The Annual Report of Henry L. Clapp, Chairman of the Committee on School Gardens and Children's Herbariums, was also referred in like manner.

President Appleton announced that he had decided to defer the delivery of the usual Annual Address of the President to a later meeting, as there were important matters now under consideration which he wished to mention in it.

The President called attention to the Schedule of Prizes for 1898, and also announced that the first of the course of lectures before the Society would be given on the following Saturday.

HENRY T. CLINKABERRY, of Trenton, N.J.,

having been recommended by the Executive Committee for membership in the Society, was on ballot duly elected.

On recommendation of the same Committee

PETER NØVIK, Secretary of the Norwegian Horticultural Society, Christiania, and

BENJAMIN LINCOLN ROBINSON, Ph.D., Curator of the Gray Herbarium of Harvard University, Cambridge, were elected Corresponding Members of the Society.

Adjourned to Saturday, February 5.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 8, 1898.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following lecture was delivered:

THE BUSINESS SIDE OF FRUIT CULTURE.

By J. H. HALE, South Glastonbury, Conn.

Members of the Massachusetts Horticultural Society: I shall speak to you today on the Business Side of Fruit Culture. This is an important side in this country, and one which is growing in importance. This growth is hardly realized by one who is not in close touch with the subject. One branch in particular in which this growth is marked, and one which I have had especial opportunity of studying, is that of nurseries. Up to 1890 there had been, in this country, no investigations on this subject. In the Census of 1890 this question received special attention, and I was appointed by the Superintendent of the Census to take charge of and report on this branch of horticulture. I found during my investigations, which covered the whole country, that while, previous to 1800, there had been but few commercial nurseries in the country, there were, in 1890, nearly five thousand. Statistics showed that these nurseries contained the enormous numbers of 240,000,000 apple, 38,000,000 cherry, 49,000,000 peach, 38,000,000 plum, and other trees, as well as 271,000,000 strawberry plants, 86,000,000 raspberries, 49,000,000 currants, etc. These represent, however, a two years' supply. I was astonished at the great numbers, and it seemed as if the country would be overstocked. But when one comes to consider that carelessness in the nursery,

in transporting, and in receiving and planting, result in the loss of fifty per cent, and that more than fifty per cent of the remainder is lost by the poor treatment received by the trees after they are transplanted, leaving only twenty-five per cent which survive three years after leaving the nursery, and that only a small percentage of the remainder comes to perfect fruitage, it is apparent that the danger of overproduction is not so great after all. With commercial planters, on the contrary, nearly ninety per cent of the trees bought are made to grow; so that the man who has a *business* interest loses but ten per cent.

Among semi-tropical fruits we find that the growing of oranges, especially in California, has greatly increased — hardly 1,000,000 boxes in 1890, while the present season's crop promises 7,000,000 boxes at $2.00 or more per box in the orchard, and young trees already planted will soon increase this yield to ten or twelve million boxes. This is practically a new field of orchard work, and though orange growing is not of special interest to us in New England, every pomologist should feel an interest in all departments of fruit growing in his own country. Every commercial fruit grower should keep in touch with the details of all such matters. He must also keep in touch with the market, know what the demand is for, and know what prices the different fruits bring, and why it is so. Unless he does this he will not get his full reward. He must give no less attention to growing, and more to keeping abreast of the times.

Another field of study for the commercial fruit grower is that of soil. Special soils are needed for special varieties of fruits, and a man must study closely the soil conditions and the adaptability of varieties to the various soils. He must also watch his neighbors and see what they are doing, and learn from the mistakes of others as well as from their successes.

But the greatest thing for him to study is himself. Does he *enjoy* the plants? Does he enjoy working and planning for them? To attempt to go into commercial fruit growing just to make money is worse than useless. A man does that best which he most enjoys. Whatever you do you want to get pleasure out of. So do not enter commercial fruit growing unless you have a love for it, and so are better able to attain the higher possibilities of fruit culture. And one must not be discouraged by the various failures or misfortunes that may come to him in

his work. A man who will become easily discouraged by a frost, a drought, insects, or fungus pests is not likely to succeed.

Just what fruits one should plant depends to a great extent upon the farm itself, upon what the man enjoys, and to a degree upon the markets which he aims to supply.

The new race of Japanese plums are fruits to which a good deal of attention has recently been given. They are early and abundant bearers, and have the advantage over European plums of being better adapted to our soils, and cover a very wide range of season — from early June till October. Many of them are of high quality, and will keep in good condition from one to two weeks after being picked ripe from the tree.

Of our older fruits the apple is the surest and best. It is easy to grow and will nearly take care of itself; still that is not the best way to grow it. We have lately heard a great deal about "abandoned farms." Many of them may not be adapted to growing the finer crops, but it seems to me that many of them offer a fine opportunity for growing apples. When we consider how well the apple tree does without much culture, and when we note the ever increasing demand of the world for apples of fine appearance and high quality, it seems as if it would be a good thing to devote some of the abandoned farms to high grade apple orchards. People will generally say that there is not much profit in planting apple trees on these hilly farms in New England, but in my opinion the man who will plant a hundred or a thousand trees on such a farm, and will give them thorough culture, feeding, spraying, and pruning, and will pay careful attention to thinning the fruit, will get winter apples of fine appearance and good quality, — too many have fine appearance and *poor* quality, — and find a ready market for them, always at a price that will pay a profit. But in future years high quality must also go with fine appearance.

The talk of an "off year" is generally because the orchard is in the hands of an off man. When apple trees bear very heavily they exhaust the vitality of the tree, and the buds for the following year get insufficient nourishment, or possibly none are developed, and the next year a very small crop, or more likely no crop, is the result. The remedy for this is in thinning the fruit on the trees annually from their earliest bearing. This ensures annual fruitage except occasionally when the crop is lost through

climatic conditions. I will make the prediction that the man who will invest capital in planting winter apples, keeping them in good condition according to the best modern methods, and carefully thinning the crops, will receive three or four times the annual dividend that the average of manufacturing enterprise in Massachusetts will pay. Right apple culture is sure to pay better than manufacturing, and for many years to come there will be less competition between apple culturists than between manufacturers.

In cultivating the peach the climatic conditions are such that the fruit grower has to be very alert to prevent damage to his fruit buds in Massachusetts. East of the Connecticut river peaches may be grown well on many acres of high, dry lands by carefully studying the conditions, by feeding well, and by giving good frost drainage. It is best to plant on an abrupt knoll, so that frost will run off quickly. By selection of land affording the above conditions peaches may be grown with success. They may be grown profitably too, for there is a great demand for good home grown peaches ripened on the tree, as is evinced by the carloads brought here from other localities and sold at good prices, though far inferior to those that may be grown here.

We will next consider small fruits. The markets give liberal returns for fruit of the highest grade. We shall find, however, that most of the *fine* canned fruit put up in glass for the best market is that brought from across the water, and I wonder that we Yankees have not awakened to the possibility of taking this market for our own. Certainly our boys and girls can do as well as the peasants of Europe.

There is another fruit (if such it may be called) which is very interesting to me, and that is the chestnut. In southern New England the trees in field and forest grow luxuriantly and bear full crops, though the nuts are small. When the right time comes the boys and girls rush out and gather the nuts and carry them off to market. How greedy the markets are for them! The whole supply is gone in six weeks, though the people would eat them all winter. We import large quantities of foreign chestnuts, but if we could get enough native chestnuts of a large size, with the fine quality of our nuts, we could displace the foreign supply with our own product. Still better results could be obtained by grafting our chestnut sprout lands with large, sweet

Japanese varieties. Money invested in growing chestnuts for market in this way would pay large rewards, for native sprouts grafted with the early bearing Japanese varieties will furnish paying crops in six or eight years, and this would certainly be a promising industry for the people of New England, wherever the native chestnut grows freely.

The whole theory of successful soil culture consists in selling water, because it is the cheapest gift to man. The grain farmer cuts great chunks off the plant food in the soil and sends it away. So does the potato grower, the market gardener, the hay farmer, and, to a less extent, the dairyman. The fruit grower keeps most of his plant food at home and sells water just as truly as though he tapped the spring and piped its water down into the market, only the fruit baskets take the place of pipes.

Fruit culture is one thing that enables us to sell watered stock and satisfy our customers. Disguised in the luscious strawberry, blooming raspberry, ebony blackberry, or beneath the rosy skin of some one of our delicious tree fruits, water finds a ready market at prices that leave "millions in it" for the one who most skilfully assists Nature in "turning water into wine" (fruits). Every season occurs the apparent miracle of turning water, often impure and unwholesome, into rich and healthful fruits, which are "absolutely pure," and free from germs or microbes.

How best and most economically to assist Nature in the work, and reap the greatest rewards, is the question. How shall the watercourses be turned into the channels of tree, plant, and vine, and help to turn the wheels of fruit culture in such a way as to give the best final results?

A deep ploughing and a thorough pulverization of the soil will make it capable of holding much more water than before. A cubic foot of soil will hold, after being pulverized, a hundred times as much water as that soil would hold before. This water will be taken up by the roots of your fruit trees and so will swell up your fruit. If you cannot keep enough moisture in the soil by pulverizing you will have to try to do it by mulching, and if you cannot by mulching then by irrigation, but let me say that you cannot irrigate a large tract with windmills and tanks.

Just at present a bushel of apples, wheat, or potatoes sells for about the same price, $1 for 60 pounds. In the apples we sell 1 ounce nitrogen, 1¼ ounces potash, and ½ ounce phosphoric acid,

which costs 1½ cents, leaving 98½ cents for the water. Potatoes take from the farm 4 ounces nitrogen, 2 ounces phosphoric acid, and nearly 5 ounces potash, valued at 6¼ cents, leaving 93¾ cents for the water. The bushel of wheat has 1½ pounds nitrogen, 10 ounces phosphoric acid, and 5 of potash, worth 30¼ cents, leaving only 69¾ cents for the water. Fifteen bushels of apples take no more plant food from the soil than one bushel of wheat, yet bottled up under their bright skin you can sell 765 pounds of water for $14.77! To sell the same amount of water in wheat would take 84 bushels, or the product of five average acres, while the apples would come from one well grown and well nurtured tree. Eighteen pounds water, ¼ ounce nitrogen, ⅛ ounce potash, and so little phosphoric acid that you cannot see it with a microscope, all costing less than ½ a cent, make 10 quarts of strawberries, that sell for $1, the same as the bushel of wheat, which takes sixty times as much plant food from the soil. Selling water in a strawberry basket enriches both the farm and the farmer.

My trial bed and test plot of strawberries is on medium sandy loam soil, well pulverized to the depth of 15 inches, then subirrigated by ¾-inch perforated iron pipes, lying 6 feet apart, 1 foot below the surface. Every condition is as favorable as I know how to make it for pumping water into strawberries, and so securing the greatest size and yield. It contains 12 plants each of all leading varieties. Each plant is allowed 2¼ square feet of land. Six of the largest and most productive varieties yielded an average of a little more than one quart to the plant, 18,360 quarts per acre. The average for the whole bed, including many shy fruiting varieties, was ⅝ of a quart per plant, or 13,115 quarts per acre, 400 per cent increase over 3,200 quarts, the average yield in the State. These berries were so puffed up in size and beauty by extra conditions that their selling price was 50 per cent above average market prices.

If with water you can float 400 per cent increased yield into market and soak the price up 50 per cent more, does that not show profit enough to keep all soil pumps well oiled and leave a good margin for outside fun? Three hundred and forty of my big Japan plums, 82 per cent water and 18 parts solid, made a bushel that sold at $4.80, while 720 of same varieties 26 parts solid and only 74 of water, made a bushel that sold the same day in the

same market at $2.56, or over $100 per barrel for the extra percentage of water in the larger plums. Open up the water-courses of the soil, and be ready for the flood tide of prosperity; it is of no use to dam it with "I can't!"

My big peaches — 100 to the bushel — 92 parts water to 8 parts solids, sold at $5; the same variety, 400 to the bushel, were 84 parts water, 16 of solids, and sold at 70 cents per bushel — $4.60 for the water and 40 cents for the solids in the large fruit, and 58.7 cents for the water and 11.3 cents for the solids in the small ones, or $5.64 per gallon for *extra* water.

Next to thorough soil culture is a matter which I think is of great importance, and that is cultivating the plants late into the fall. For the more thoroughly we can cultivate the plants late in the season the better will the fruit buds winter. If we cease culture early, wood and fruit buds mature early, so that the leaves fall off too soon, the warm weather of late fall will sometimes start the buds of next year to swelling, and then when the severe winter weather comes the buds are winter-killed. There is, however, even danger of cultivating *too* late. Yet for all this it is often the late growth of a plant that stands the winter best, and you can notice, among tender blackberries and raspberries, where a plant was exposed, that the little late suckers withstood the cold while the early matured canes were often winter-killed.

To keep foliage in good condition we must occasionally spray the plants. The finest fruit comes only from trees and plants that have healthy foliage. Then there is another important fact. I have seen apple and pear orchards which have failed to fruit because of too much foliage and soft wood growth. This fault can be corrected by witholding stable and other nitrogenous manures and by root pruning of over vigorous trees, which treatment will cause them to form fruit buds and become productive.

The next subject to consider is that of cover crops. The land in orchards should not be left bare through the freezing of late fall and early spring. After fertilizing, leaving the ground bare is wasteful, and a cover crop should be sown wherever possible, not only to prevent the waste of fertility, but also as a protection to the tree roots. These cover crops should be of such plants as will gather in the free nitrogen of the air, so that when they are ploughed under, the soil will be enriched. In Connecticut I find clover to be one of the best crops to plant. In Western New

York and Michigan they use various kinds of vetches. The cover crop should be sown in August or early September, and should be ploughed in in the spring. It should be done early in the spring — not left till May or June. This treatment will many times repay the planter. As I said, it should be ploughed in early in the spring, and I should especially state that this means *shallow* ploughing. Deep ploughing is apt to be pretty dangerous. This cover crop is very good for green manuring. After ploughing in in the springtime, a summer green crop may be sown if it is desirable to enrich the land at small cost, and I find that the Southern cow pea does very well. Early in June I should plant two or three rows of cow peas in drills between each two rows of young orchard trees. Then culture can be continued.

All purchased fertilizers cost a good deal, and yet commercial fruit growers need buy scarcely a dollar's worth of high priced nitrogen. Mother Nature will give him a very good fertilizer if he uses these cover crops, and he need never buy nitrogen. Of other kinds of fertilizers phosphoric acid and potash are most needed, but in all this question of fertilizers the local soil conditions have to be studied, and plans made with regard to them. But one thing must be remembered, and that is that stable manure must be avoided in most orchards after they come of fruiting age.

We now come to the subject of diseases and insects which injure the health of fruits. The injurious insect of which we hear a great deal of late is the San José scale. There is, however, one very good thing about the San José scale. It has scared the fruit growers. Men are now looking over and examining their fruit trees as they never did before, and they examine critically every tree they buy, and as a result their orchards are likely to be much better known and cared for than ever before. So the San José scale, a dangerous pest as it is, has proved a great blessing. And the San José scale is the one thing that will kill an apple tree. So apple trees that have rather been left to themselves in the past must now be carefully looked after or go down. This of course means better apple culture and better apples.

Then there is the disease of yellows, which attacks peach trees, and spreads easily from tree to tree, and if left will kill the trees. In eradicating this disease the most vigorous measures must be taken. Every infested tree must be taken up and

burned, root and top. A man who pulls up and burns a tree infested by yellows does good missionary work. I take such a tree out the first day I see it. I recently sold a lot of peaches here in Boston market, and near me was a man selling two loads of peaches which were full of yellows. He got 25 cents a basket for his peaches, while I got $1.35 for mine. I was ahead $1.10 on every basket, because I was "scared" of yellows. The man who is scared is bound to make money. He is alert to the danger that threatens his business, and so uses every known means to check loss.

Then another disease is the rust of the strawberry, or the red rust, as it is called. On some soils and with some varieties, this does not spread, but on others it does, and the treatment to give the plants is to dip them, when setting out, into a solution of Bordeaux mixture, then to spray once or twice during the summer with the mixture, and again once or twice early in the following spring. It may cost $15 per acre through the season to spray; it will pay, however, and pay handsomely.

We will next consider the thinning of fruit. I wonder how many of you practise the thinning of fruit on your apple trees. Now, apple trees will do a good deal if you do nothing for them. But the man who wants good apples — apples that will pay — in the future will practise thinning his fruit. I should take a young tree which attempted to produce one hundred apples, and remove at least fifty of them, leaving not more than fifty to ripen. The next year, if it attempted to produce two hundred, I should leave one hundred or less, and the next, if it had one thousand apples, I should leave three or four hundred only. By this method I should get that tree into the habit of annual bearing. The man who will make fruit growing a profitable business will thin all his fruit. A peach tree that will set one thousand peaches needs to have six or seven hundred thinned off. The commercial side of fruit growing demands thinning of nearly all your fruits. You will get more bushels to the tree within reasonable bounds; the more you throw away the more pounds or bushels you will have left, increased size more than making up loss in number. In thinning Japanese plums I should leave the fruits four inches apart, and peaches from five to six inches. If you make a practice of thinning your fruit from the trees, you will usually get four dollars for one. I have often had it in-

crease the crop fifty per cent, and the selling prices five hundred per cent.

The next thing after producing fine fruit is to know how to sell it so that it will bring the most money. Great care needs to be given to the picking of fruit, and careful attention to the marketing. You want to go into the market and study the sales of fruit. You will find that that which brings the best price is that which is the neatest, the fullest, and the most honestly packed for local markets. You want to leave the small fruits until thoroughly ripe, and then pick in the cool of the day. The fruit should be packed always in a cool place and put in tight packages, for the less the air reaches the fruit the better it will keep. Then the crates and boxes should be kept away from the air as much as possible. In packing you want to grade your fruit. The finest will go for fancy, then number one and seconds. All, however, should be good, sound fruit, of as even size and quality as possible. The three or four grades should be uniform throughout. Ask your dealers what kind of packages sell best. Then get the neatest and most attractive packages you can, and have the fruit put up as neatly as possible. It should be graded by hand. In many fruit districts they have a method of grading tree fruits by machinery, and it appears at first sight to do no harm to the fruit. But in a few hours the fruit will lose color by this method of grading. Then you want to pack honestly, from top to bottom, and just as full as possible. But I would not get men to do the packing. Hire girls for this part of the work, and you will find that the work is better done. Next label your brand and then strike upon a good dealer. Tell him it is a good thing, for you know that it is, and make him know it too. Have a good commission man, and, if possible, make him come out to your place and see your orchards, and study your methods of doing the work. Have him *believe* in your fruit.

The business side of fruit growing means belief in yourself, and then getting those with whom you trade to believe in you.

Finally, believe in your line of business. Don't get into it until you have carefully thought it out and made up your mind that you can succeed in it, and then stick to it all the time, on the alert at all times for most approved methods and varieties.

DISCUSSION.

A gentleman asked what treatment was best for the black knot.

Mr. Hale replied that it should be cut out thoroughly as soon as it appears. Then the trees should be sprayed with Bordeaux mixture. This disease is now known to be controllable.

C. S. Pratt asked how to cool off berries before packing them.

Mr. Hale replied that if they must be picked in the heat of the day he would pack in ventilating crates and then haul the crates to a cool place.

Samuel H. Warren inquired whether it was better to pack apples in barrels or in crates.

Mr. Hale replied that he should use whatever kind the market demanded. He believes, however, that the time is coming when barrels will be abandoned for crates or boxes. The former, being easy to roll, make injury to the apples greater than would be the case with boxes.

Mr. Warren said he wished to ask about spraying strawberry plants for rust. The Experiment Station at Amherst had not been successful in this treatment, and he should like to know what the reason was.

Mr. Hale said that as he did not know the conditions he could not say; but on his farm the Downing and Marshall strawberries, which rust as quickly as any varieties, are kept wholly free from rust by the use of Bordeaux mixture. He would spray at least once in the fall and twice in the spring before fruiting.

Mr. Warren wished to know whether Mr. Hale had left any plants unsprayed, so that he could tell whether the plants on his farm would have been affected by rust at all.

Mr. Hale said he had left some and they were attacked by the rust.

A lady asked what varieties of strawberries the lecturer would recommend, and whether he thought hill culture or matted rows the most profitable way of growing plants.

Mr. Hale replied that as to variety it would depend largely upon the soil. As to the most profitable way of growing he would say hill culture by all means. People sometimes prefer matted rows, but chiefly because that is the easier way.

Benjamin W. Putnam remarked that the lecturer had said that rust reduced the yield of the strawberry plants very much, but

that he knew a strawberry grower who said the rust did not harm the plants; he should like to know how much Mr. Hale thought rust hurt the plants.

Mr. Hale replied that he had known the yield to be cut down seventy-five per cent by rust.

Mr. Frost wanted to know whether the lecturer meant to say that hill culture would be better than matted rows.

Mr. Hale said he certainly did.

Mr. Frost said that the hill system had been tried here long ago and cultivators had returned to the matted row system. He thought that the best fruit came from matted rows, while in the hill system one-third of the hills would be found dead.

Mr. Warren said that Mr. Frost practically cultivated in the hill system.

Thomas Harrison said that he did not, himself, find the rust very troublesome, and wished to know why he had not.

Mr. Hale said that rust spreads according to the weather conditions. Warm, damp, cloudy weather made it spread, while the opposite conditions would not favor its increase.

Robert Farquhar wished to know what remedy Mr. Hale would recommend for the San José scale.

Mr. Hale replied that whale oil soap was by all means the best remedy. However, he had had very little trouble with this pest.

Professor W. M. Munson said that he thought the reason Mr. Hale had not had trouble with the San José scale was because he had been using Bordeaux mixture.

Mr. Harrison said he had found this pest some time ago on vines of the Concord grape. He thought it might have been brought on some California grape vines. He had, however, pulled up and burned the vines, and had never seen the scale since. Mr. Harrison also said he should like to ask whether Mr. Hale had taken into consideration the cultivation of the red currant.

Mr. Hale replied that the market for red currants had been largely overstocked the past ten years.

In answer to further questions Mr. Hale said that natural apple trees are best to graft on. In treating apple trees he would trust to chemical manures, and would mulch if there was danger of drought. Apple trees, if well cared for, would not need to be scraped, but in case of a person buying an old orchard which was in poor condition he would advise scraping the trees and then

spraying twice with copper sulphate. It would be best to head trees rather low, as the more work that can be done from the ground the better. It is better to grow trees with one leader, for two or three leaders tend to break down a tree.

Arthur M. Clement expressed himself as being in favor of a peach yellows law, and wished to ask Mr. Hale why the peach yellows law in Connecticut was repealed.

Mr. Hale replied that a combination of circumstances had caused the repeal of this law. For one thing, many of those who were against it were opposed to progress in agricultural matters generally. The law had worked admirably for five years. Some private growers who had only one or two trees which bore well, though affected by the yellows, felt it unfair that their trees should be destroyed, not seeing how this would benefit the community, but only how it affected themselves at the time; they would rather have poor fruit than none. All the commercial fruit growers wholly favored the law. He thought the law would be reënacted the next year, as it had been repealed by combinations of votes of four or five factions. Not one single progressive horticulturist in Connecticut wanted its repeal.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 15, 1898.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following lecture, illustrated by many stereopticon views, was given:

HORTICULTURE IN HOLLAND: DECORATION IN PUBLIC PARKS, BULB GROWING, NURSERY STOCK AT BOSKOOP.

By JOHN K. M. L. FARQUHAR, Boston.

Holland presents to the horticulturist many interesting features peculiarly her own.

Her wet soil and moist atmosphere have rendered her unable to enter many avenues of horticultural industry open to Germany and France, but of the few available to her she has not failed to make the most.

For two hundred years she has supplied the nations of northern latitudes with bulbs from which to raise flowers to gladden their conservatories in winter, and their gardens in spring, and she has established a constantly increasing business, the monopoly of which seems assured to her for ages to come. Her exports of bulbs and nursery stock now aggregate five million dollars annually.

Such elaborate flower stores as we have in Boston are not to be found in Holland, for as we pass through Rotterdam we see a flower market where a few men and women do the business, the flowers being chiefly of the more ordinary kinds — bunches of candytuft, stocks, sweet williams, mignonette, and outdoor roses. The flowers are brought here in the morning, sold at low prices, and by noon the business is over. Amsterdam has a similar market.

Dutch horticulturists devote most of their energy to supplying the wants of other nations, their home trade, especially in cut flowers, being exceedingly small. Many of the residential streets, however, have a strip of grass with shade trees and tastefully planted flower beds on one or both sides of the canals which occupy the centre. Even in the narrow business streets of Rotterdam we find valuable space devoted to trees — more, I think, than our citizens would be willing to allot under similar conditions.

The Dier Gaarde (which is a botanical and zoölogical garden combined) presents many features of interest. It is really an improved marsh, with the inevitable canals widened here and there into ponds, the excavated material adding to the land area. The surface being perfectly flat, the landscape gardener has had to depend largely on the grouping of trees and shrubs for variety of scenery.

The shrubbery is extensive and select. In addition to such shrubs as we see in our gardens, we find the yew, the bay, *Aucuba Japonica*, *Araucaria imbricata*, golden thuja, green and variegated hollies, and many other choice species not hardy in New England.

There are magnificent groups of Japanese maples, and roses grown in standard form — that is, grafted on stems three or four feet high; also fine collections of irises, pæonies, and other hardy plants.

There is a large curvilinear iron-framed conservatory which contains a creditable collection of palms, cycads, and other trop-

ical plants. Also an aquatic house in which was a fine plant of the great annual South American water lily, *Victoria regia*, in bloom.

In Holland we find no such gigantic greenhouses as may be seen on the larger estates in England, like Chatsworth or Sion House; hardy trees, shrubs, vines, and herbaceous plants being more generally depended on for landscape decoration. This policy we find successfully exemplified in Boston's new parks.

The Dier Gaarde is, however, a *garden*, and here we find a number of tastefully arranged flower beds. Visiting this place, several years ago, I found more than half of these beds planted with geraniums. Now we find that the geraniums have given place to tuberous and fibrous rooted bedding begonias. Holland has only been keeping in line with other nations in making this change. In England, France, Germany, and even in our own Newport, we now find begonias the most popular class of bedding plants. They are used most extensively, perhaps, in Paris.

The dwarf forms of *Begonia semperflorens* are largely employed, and these have been found to do well in this country, especially the varieties Vernon and Erfordia.

In France the varieties of *Begonia fuchsioides* and *B. Wiltoniensis* and the dwarf, compact, tuberous sorts are in favor. In the Parc Monceau, in Paris, I beheld a bed of nine thousand plants of the last mentioned, with small, double, Jacqueminot-rose-color blossoms, which was truly gorgeous.

I do not wish, however, to convey the impression that geraniums have been wholly discarded as bedding plants; they will always be used to some extent.

I will not trespass upon your time to speak further on bedding plants except to say that set figures are giving place to simple mixed beds. For example, a bed composed of *Calceolaria rugosa* (yellow), purple heliotrope, and *Centaurea candidissima*, set promiscuously with a border of achyranthes, was one of the most pleasing.

One of the pleasantest parks in Holland is the Wood-land, surrounding the summer palace at The Hague. The Wood covers an area of four square miles, and is intersected by magnificent avenues. Situated as it is near the most modern and fashionable city of the country, and convenient to Skevening, where tourists

and invalids resort from all parts of Europe for its famous wind baths, the Wood is much frequented.

About the palace (where John Lothrop Motley, of Boston, spent many an hour as the guest of the queen while resident at The Hague gathering material for his famous history, "The Rise of the Dutch Republic") there is little floral decoration, and it can well be dispensed with, for the rustic beauty of this sylvan scene would not be improved by it.

In Haarlem there is a similar wood which has been used as a place of public recreation for more than five centuries. In this wood, in 1420, Laurens Koster is said to have discovered the art of printing, while cutting figures on pieces of stick and making impressions with them for the amusement of his children. Among the trees we find oak, elm, beech, birch, linden, maple, ash, and horse-chestnut.

Haarlem is the largest city of North Holland, and the trade centre of the bulb growing district. In the suburbs we find many luxurious residences, with ample grounds, many of them the homes of wealthy bulb growers.

We proceed by steam train from Haarlem, by way of Vogelenzang, where we pass through extensive bulb fields, towards the Lake of Haarlem. There is, however, no Lake of Haarlem now; only a great canal, 38 miles in length, from 115 to 130 feet wide, and 14 feet deep, in which ships sail and steamers ply, surrounding 70 square miles of low land that fifty years ago was a lake. This region is of interest to us, because along the western portion of the canal we find the finest hyacinth ground in Holland.

In 1837 the king appointed a commission to consider the best means of draining the lake — partly on account of the known richness of its bed, but chiefly because of the danger of inundation to which the cities of Leyden and Amsterdam were exposed by the rising of its waters during hurricanes.

The commission found the project practicable, and the great canal was built for the double purpose of conveying the water to the sea and to accommodate the shipping, which had been heavy on the lake.

The water was pumped from the lake into the canal by three engines, each capable of raising one hundred and twelve tons of water at a stroke, or a million tons in twenty-five and a half hours, and it took these three monsters four years to pump the

lake dry. The vastness of the undertaking will be better understood, perhaps, when I tell you that the area of this former lake now supports a population of ten thousand.

The soil is of various kinds — peat, clay, and sand, the last being what is chosen for hyacinth culture. It is prepared by being given a heavy application of cow manure. The bulb growers use manure lavishly, and it is brought to the fields in boats. It may come from Leyden, Amsterdam, or Rotterdam, as these and other cities are accessible by water, through the network of canals which penetrate the country.

Let us now look upon a field on which manure has been placed, ready to be spread and dug in. The quantity put on seems large, but this is necessary, especially for hyacinths, which must be grown in sharp sand without admixture of loam, peat, or clay. So essential is this condition held to be that the leading hyacinth specialist in Holland showed me with much enthusiasm a field (or rather a series of plots intersected by canals) covering forty acres, from which three feet of mixed alluvia had been removed, in order to reach a stratum of sand suitable for hyacinth culture.

We shall now look at one of the reclaimed fields on which workmen are engaged in planting bulbs. Hyacinths, narcissuses, and tulips are set in trenches six inches deep; crocuses, scillas, and snowdrops in trenches three inches deep.

Before cold weather sets in, all the planted fields are thickly covered with reeds, which grow along the edges of the canals, and are also cultivated in the north of Holland for this use.

Great care is taken to prevent frost from reaching the bulbs, for as they are planted early in autumn they soon make long roots, and frost reaching the bulbs would raise them up and detach them from their roots. I believe that among our New England cultivators this is a frequent cause of failure to obtain the best results.

The spring flowering bulbous plants are rapid growers, requiring a large supply of nourishment, and unless their roots are well developed in advance of the top, and kept in good condition, they will be unable to furnish the needed food, and failure, or partial failure, will result.

Growers who would sell direct to seedsmen must grow and be prepared to furnish bulbs of from four hundred to five hundred

sorts of hyacinths, which have distinct and well-defined characteristics. In fact, the growers and many dealers can distinguish many of them from the appearance of the dry bulbs.

Fifty years ago the growers generally had longer lists than now, and the double sorts were most esteemed. Now the single sorts are preferred, as they usually produce larger and fuller flower spikes.

The propagation of hyacinths is by offsets, which form at the base of the bulbs. For propagation the largest bulbs are selected. Each bulb is cut across the base several times, or has the base hollowed out, to increase the number of offsets. They are allowed to dry in the sun, and are planted in September or October.

The hollowing-out method gives more offsets than the cross-cutting, but it does not succeed with all sorts, and the bulblets being smaller take a year longer to attain full size.

The variety of which the greatest number is grown is the single pink Norma, and when one grower gives an estimate of the extent of another's hyacinth trade he states how many thousands of Norma he grows, just as our printers estimate the work of a compositor by the ems he sets. I know of one grower whose trade requires 80,000 Norma annually, the product of about two acres.

Now we see a field of tulips in bloom. In the distance is a stack of reeds which had protected them during winter, and which are stacked for use again. They can be used for three or four years, and look not unlike small cane stakes, such as we use for staking plants.

Next we see a field bordering on the Lake of Haarlem district. In the distance you can distinguish vessels on the great canal, while the dark lines running across the fields represent smaller canals. You can also see a windmill used in pumping water from the smaller canals into the main one.

Now we see a more extensive field of tulips in bloom. The trees on the right are but single rows of poplars on each side of a canal. The poplars are trimmed each year, and while affording protection from wind do not sap the ground.

The average grower must cultivate in all about four hundred and fifty varieties of tulips. Of these about four hundred are varieties of the ordinary garden species, *Tulipa Gesneriana*, which was introduced into Western Europe from Turkey in 1554.

There are about fifteen varieties of the dwarf sweet-scented Duc Van Tholl tulip (*T. suaveolens*), which in Europe are extensively used for winter forcing.

The famous Semper Augustus tulip, which during the tulipomania in Holland was the most prized sort, and which sold for about two thousand dollars apiece, is not now to be found.

The propagation of tulips is by bulb offsets, each root producing two, sometimes three, saleable bulbs, and perhaps one or two of smaller size which require another season's growth before they are fit for market. They are also easily raised from seeds, the seedlings coming at first self-colored. While they remain self-colored they are known by the name of "Breeders." These have been made very popular the past four or five years by giving them the name of "Darwin" tulips. After a few years of cultivation they break away from their original color.

If a white tulip becomes striped or marked with another color it is called a Bybloemen. Of this class the rose or red-tinted Bybloemens, known as "Roses," are perhaps the most desirable. A tulip having a yellow ground marked with another color is called a Bizarre.

In the early part of this century tulips having variegated flowers were the most esteemed. Today such self-colors as Gold Prince, the beautiful rose-carmine Proserpine, Vermilion Brilliant, and the White, Yellow, and Scarlet Pottebakkers are the most prized. There are, of course, exceptions; the most conspicuous is the noble Kaizerkroon — crimson, with a wide edge of yellow.

From a million and a half to two millions of tulips are now required annually to supply New England.

The tulip has become, with us, the most popular of the spring flowering bulbs and, compared with other spring bulbs, we use a larger proportion of them than other nations do.

As we look at these views we get an idea of the vast area devoted to tulips. Here is a view taken from near the railway station at Venenburg, showing in the distance the village of Hillegom.

Here we have a view of beds of tulips, which shows the single rows of poplars dividing fields or bordering canals like latticed fences.

Here is still another field of tulips, taken so as to show one of the canals, which is probably ten or twelve feet lower than the great canal.

At the present time daffodils are receiving more attention from hybridizing than any other class of bulbs. There are now in Holland yellow daffodils as much larger than the Emperor and Empress varieties of *bicolor* as these exceed the old Trumpet Major. One, Narcissus Victoria, has already been offered, and others will follow when the stocks become large enough.

Although the largest and finest bulbs still come from Holland, daffodils are extensively grown in England, Ireland, the Island of Guernsey, and France, and in talking recently with Dr. Campbell, of the University of California, he said that he believed his State would within a generation supply a large proportion of the narcissuses used in this country.

I cannot pass this part of our subject without expressing our indebtedness to Mr. Peter Barr, of London, who has done so much to arouse interest in daffodils. He offered substantial prizes for the best collections of them at the London exhibitions, at which his son Rudolph, when only ten years of age, was a frequent competitor; but his father insisted that he should carry the flowers in a basket without the names, and that he should name them himself in the show room. I have seen him thus name over sixty sorts. The beautiful Poeticus Poetarum was saved from extinction by Mr. Barr, and he has added many choice sorts to modern collections.

Japanese lilies are seldom grown in Holland now; the Dutch dealers find it cheaper to import them from Japan. They are usually shipped by way of Vancouver and New York. The Dutch still receive many orders for them from this country, which involves the shipment of them from New York to Holland and back needlessly.

It is a singular fact that double snowdrops do not succeed in Holland, and that the Dutch obtain the bulk of their supply from Lincolnshire, England, where for many years they have been collected by the chimney-sweeps as they travel about the country, and, when dried and cleaned, are sold to the bulb dealers in Holland.

Let us look upon one of these fields three months later. We see a score of men on their knees, some of them having their hands buried in the sand. It is harvest time, and they are lifting bulbs. No spades or forks are used lest the bulbs should be injured; the men dig them out of the loose sand with their

hands. The bulbs are laid carefully in baskets and conveyed by boat to the warehouses.

The workmen still wear wooden shoes, not altogether for economy: they are believed to afford better protection from rheumatism, which is prevalent in Holland, than leather. They are made of willow wood, which is light and not liable to crack.

The bulbs are conveyed by boat from all parts of the farm to the warehouse, a canal leading up to or inside of the buildings. These large storehouses, two stories high, are shelved with strong slats from the bottom to the top, the shelves being eight inches apart. As you look through the windows you can see the shelves packed with bulbs to dry.

The lower floor is invariably devoted to hyacinths, which are never laid more than two layers deep on the shelves. Tulips, being lighter to handle, are taken upstairs and similarly stored, but four or five layers deep.

Great care is exercised to have the freest circulation of air through the building, but no direct sunlight, which would crack the skins of the bulbs.

When sufficiently dry the bulbs are counted up into lots of perhaps 100, 250, or 500, as convenient, and placed in bags which are left open. When they are needed for shipment buckwheat chaff is put in to prevent bruising, and they are then packed up for transport over the world.

The value of bulbs exported annually from Holland aggregates $3,000,000. England takes half of the crop, the United States and Germany each to the value of about $300,000, France and Russia each about $200,000, and Norway and Sweden together about $150,000 worth.

On the southerly side of the Lake of Haarlem are the well-known nurseries of Boskoop. There are over four hundred nurserymen here, and they cultivate land which in almost any other part of the world would have remained salt-water marsh. So low was this region that to get land at all, the canals, which elsewhere are usually six feet deep, had to be dug eighteen feet deep, and frequently they had to be paralleled. The land has been made in plots about a hundred feet wide and half a mile in length, the land surface being about eighteen inches above the water in the canals.

The soil is chiefly peat, which is improved by having sand or

clay mixed with it. It is very rich, and the deposits from the bottoms of the canals, which are dredged out every autumn, form sufficient dressing.

Here we have a field of clematis, the growth of a single season, and here is another view showing clematis of one season's growth.

Plants make wonderful growth here — everything seems to luxuriate; and as we travel through these interesting fields and cross the canals on little plank bridges from plot to plot, and nursery to nursery, we note how carefully every foot of the precious earth is utilized.

As we look at another view showing large plots of Chinese lilacs let me tell you that very few (if in fact any) of these Boskoop nurserymen carry stock of all the lines they catalogue. Each grows a few specialties and buys the rest of his neighbors. These nurserymen have formed a society known as the "Association Flora of Boskoop," which seeks to promote their interests at home and abroad, and regulates the terms of sale between themselves.

The moist condition of the soil of the Boskoop nurseries, due to its being a spongy peat and its surface from sixteen to twenty feet below the Amsterdam high-water mark, has its effect upon the plants grown in it. They develop softer wood and the roots are less branched than those grown on higher and drier land. I have seen hybrid roses with stems twice the usual thickness and almost as soft as cabbage stalks. These frequently cause disappointment when transplanted to drier soils in hotter climates. For New England, English or French grown roses are much to be preferred.

We see in these nurseries many plants which are not hardy enough to survive our winters; such as *Araucaria imbricata*, *Aucuba Japonica*, variegated hollies, and golden thuja, for which there is a large demand, chiefly from England.

The visitor to Boskoop, if going from Haarlem, will find it most convenient to make the journey by steamer in the great canal, which is really the highway, lined on each side with interesting and picturesque scenery such as is found only in Holland.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 22, 1898.

A meeting for Lecture and Discussion was holden today at eleven o'clock, Vice-President BENJAMIN P. WARE in the chair. The following lecture was delivered:

ORIGINATING NEW VEGETABLES.

By Hon. AARON LOW, Hingham.

Mr. President, and Members of the Massachusetts Horticultural Society: In coming before you today to speak upon the subject of Vegetables, their Originating and Manner of Improvement, and the Varieties best adapted for General Cultivation, I am aware of the great importance of the subject to the farming community, and to every one who plants a garden. I do not presume to be authority on strictly scientific methods of procedure, but will give a brief history of my own experience and practice for the past forty years.

I shall take it for granted that you wish the subject treated in a plain and practical manner, so that every one present can apply the suggestions and ideas advanced to his own operations on the farm or in the garden.

All discussions before agricultural or horticultural meetings should have this aim in view, so to present the subject as to enable each member to acquire and apply the knowledge thus presented, to better methods of culture, in the use of all labor saving implements, and in planting such varieties of vegetables as shall give larger and better products, quicker sales, and thus an increased profit on his labor.

Every market gardener often notices a variation among vegetables of apparently the same variety.

One of the first principles of Nature is reproduction, and the production of new varieties by cross-fertilization or hybridization.

The improved varieties introduced during the last twenty years have been obtained by these two methods. But the searchers after new varieties should bear in mind that a sport which appears to be an entirely distinct variety will require years of careful and intelligent training to establish its points of variation and excellence.

In training to establish a cross as a distinct variety we should have in our mind an ideal as to form and the other more prominent characteristics we desire our new variety to attain, and selecting samples that come nearest to the desired points, for seed stock, persistently follow on that line until our object is accomplished.

New varieties, although apparently well established, are apt to sport back to one or the other of the original kinds from which the cross was obtained, and require careful watching for years to eliminate such points as appear undesirable.

As every year brings forward new kinds of vegetables, the up-to-date market gardener must keep himself well posted as to the merits of such varieties, and their adaptability to his requirements.

Although there are new kinds brought out which are no better than old and well-tried kinds, still among the new claimants for public favor we often find varieties with decided improvements on those previously known.

As a general farm product there is no one of more importance than the Potato. I would first call your attention to it. The early history of the potato is involved in obscurity. It was introduced into Europe at about the end of the sixteenth century. But it was a long time before it was much used as an article of food by the masses; and it was even as late as the commencement of the eighteenth century that it was pronounced by a College of Physicians in France to be poisonous and unfit for human food.

It seems strange to us that it should have taken so long to discover its merits as an article of food, when at the present time it is deemed indispensable for daily use upon the tables of rich and poor alike.

In speaking of the potato and its cultivation as usually performed we should infer that the potato itself was the natural seed, but such is not the fact. We propagate it by slips of the tubers, as we do other tuberous-rooted plants. But if we wish to produce a new variety we must take the natural seed balls.

It is a well-known fact that the varieties of potatoes now in cultivation very seldom produce the natural seed balls.

Those of us who remember the old Merino or Long Red potato, cultivated some forty or more years ago, know that, while it was

immensely productive in tubers, it was equally so in its crop of seed balls. Whether the long continued cultivation of the potato by divisions or slips of the tubers has suppressed the natural tendency to perfect its seed, or whether this effect is due to other causes, we are unable to say.

If we wish to produce new varieties we must plant the kinds of potatoes that usually produce the natural seed. The seed balls should be gathered when ripe, seed cleaned from the pulp, dried, and preserved till spring; then planted in a bed prepared for that purpose, giving close and careful cultivation, and their further development awaited.

The first year the plants are not usually very strong, and the result of our labor is a crop of rather poor looking little potatoes, from the size of a pea to an inch in diameter. The second year the seedlings increase in size and development, and we find a great variety in form and color. It usually takes from three to five years to develop seedling potatoes so as to be able to decide as to their merits.

The introduction of the Early Rose marked a new era in the cultivation of the potato, that variety proving superior to every other previously known, not only in quality, but in earliness and productiveness. Its introduction has been of great importance to the country, both as to its perfect adaptation to all sections and the large increase of wealth its cultivation has brought to the people. Its great success as an early potato induced many growers to attempt to produce new kinds from it that would surpass the original.

As the tendency of potatoes after a few years of cultivation is to deteriorate, it becomes necessary to have new varieties to take their places. Most of the kinds cultivated twenty years ago are now superseded by varieties of recent introduction. In the last half-dozen years we have had a number of new varieties of superior excellence in all of the qualities of first-class table potatoes. As most desirable of late introductions may be named the New Queen, Early Essex, Carman No. 1, Carman No. 3, Banner, Somerset, and Enormous.

From the experience of the past few years it seems indispensable to have our crop of potatoes planted very early in the season, so as to have them well advanced in growth to escape the ravages of the potato beetle, and the blight which usually appears in the

latter part of July or during August, and is apt to be followed by more or less rotting of the potatoes. Two important advantages in the early crop are that the price of potatoes is much higher than later in the season, and the land can be used for a second crop of celery or late cabbages with but little cost of cultivation, thus adding quite an amount to the yearly profits.

Another method I have practised very satisfactorily is to plant about the fifteenth of June every third row with squashes ten feet apart in the row. The potatoes being harvested early, the squashes will occupy the land later, and produce about as large a yield as if no other crop had preceded them.

In connection with the cultivation of the potato the past season, I have tried experiments in preventing scab on the tubers and blight on the vines. One of the most highly recommended methods to prevent scab is soaking the seed potatoes in a solution of corrosive sublimate according to the formula of the Experiment Station at Amherst. Another preventive is flour of sulphur, scattered in the rows when planting the potatoes. I could not see any perceptible difference in the results of either method, as the potatoes in both cases were free from the scab, while where neither was applied many of them were scabby.

In making an application of the Bordeaux mixture to the vines to prevent blight it is important that rain should not follow at least under twenty-four hours, as it will wash off the mixture before the desired effect is accomplished. In the three applications I made the past season rain followed within a few hours each time, and thus destroyed much of the effect of the mixture. Under favorable conditions I think the mixture would materially check the blight.

For a number of years much interest has been manifested in growing potatoes with commercial fertilizers. My experience has fully convinced me that the same amount of money expended for some reliable fertilizer, and applied in competition with stable manure, will give much better results in good-sized smooth potatoes, and, I think, of better quality.

Quite an important consideration is the small expense of applying a single ton of fertilizer to an acre, as compared with the cost of applying eight or ten cords of manure.

As a vegetable second in importance to the potato we may reckon the Cabbage.

In the vicinity of large markets a crop of early cabbages is one of the most profitable grown, as the demand is large and prices high.

New varieties can readily be produced by cross-fertilization, either by transferring the pollen from one kind to the other by a camel's-hair brush, or setting two kinds side by side, when the bees or the wind will make many crosses, by carrying the pollen from one to the other. Varieties can be greatly improved by careful selection of the best type of heads for seed, and continuing thus for a number of years you will find much improvement on the original variety.

For two or three years past there has been sold in the spring in the markets of New York, Philadelphia, and Chicago a variety of cabbage imported from Europe, and bringing a much higher price than any kinds of American growth.

Last spring I was pleased to receive from a seed grower in Europe a package of a number of kinds of European cabbage seed for trial. Starting the seed under glass, for medium early, I set out a piece of the different varieties for trial.

On their maturing I found two of the varieties to be extremely solid and hard, and to weigh a third more to a barrel than our best American cabbages, and to keep longer without bursting or decaying than our best kinds. The two varieties which proved the best are catalogued by European seedsmen as Amager and Solid Emperor.

An experiment conducted the past season in growing cabbages in a method rather different from that usually practised proved so satisfactory that I will briefly give the method employed. Having a piece of light loam land with a crop of winter rye standing upon it, from two to three feet high, I ploughed it seven or eight inches deep, burying the rye entirely out of sight.

The piece was well harrowed and furrowed in rows three feet apart on the thirty-first of May. Blood, bone, and potash fertilizer was scattered in the rows, at the rate of half a ton to the acre. The fertilizer was well mixed with the soil before setting out the plants on the first of June.

The plants started nicely, and grew rapidly; evidently the decomposing rye beneath was a very important help to them. The piece was cultivated twice, and once hand-hoed. The varieties grown were Perfection Red, Succession, All Seasons, and Stone-

Mason, with one hundred plants in each row. The entire piece seemed to be free from all destructive insects, as every plant grew undisturbed by any injury whatever, and every one made a large, solid head.

In all the years which I have grown cabbages I have never seen a piece having as uniform a lot of large, solid heads as this, and certainly it is strong proof of the benefit of ploughing under green crops, especially on lands long cultivated, and to me was conclusive evidence of its utility.

The above-mentioned land has been cultivated continuously since 1892, and during that time has not had any stable manure used upon it.

Perhaps I might state here that blood, bone, and potash seems to be a special fertilizer for growing cabbages. Although they did well on other fields, the above piece was far the best, which could only be accounted for by the decaying vegetable matter beneath, in addition to the fertilizer applied.

Among the luxuries of the olden time in the songs and verses of the poet were often depicted in glowing colors the merits of the golden pumpkin pie.

Since the innovations which modern customs and usages have made in the practices of that far away period of our ancestors, the Squash has succeeded to the honor sung of that old time favorite. At the present time every market gardener needs to plant quite a piece of early and late squashes to supply the daily demand of his customers.

Without doubt the best variety for early planting is the Marrow. Of the various strains of that valuable kind the Boston Marrow and Dunlap's Prolific are the best. The latter is of recent introduction, a very early variety, of fine color and quality, and immensely productive.

In passing over a field of American Turban squashes, in 1879, I found a vine with a number of nice, handsome squashes so decidedly different in appearance from the rest of the field that I stopped to examine them.

I decided from their form, varied color, and hardness of shell that they were a cross between the Turbans and Hubbards growing in a field near by. All of the squashes on this original vine, three in number, were of equal size, weighing about ten pounds each, and all growing on the vine within the length of four feet.

The three squashes seemed to partake about equally of the Turban and Hubbard characteristics. They retained the form of the Turban, and mostly its color, with the hard shell of the Hubbard. The blossom end was colored like the Hubbard, and stripes of the same color radiated to the stem. I decided that if I could train this cross to retain the hard shell, delicious flavor, and sweetness of the Hubbard, and the form and golden color of the Turban, it would be a decided novelty and a valuable acquisition. It was some three or four years before I succeeded in fixing permanently the above desired qualities. The rapid dissemination of the Essex Hybrid squash, after its first introduction, and the continued increase of popularity which it has attained, have fully sustained the high claims which were made for it on its first appearance.

As I have before remarked, it is a well-known fact that almost all crosses of vegetables are very apt to sport back to one of the varieties from which they were derived. I have every reason to believe that my last introduction, the Bay State squash, was simply a sport backward, so to speak, showing a stronger and more marked development of its Hubbard parentage. The fact that not a single Hubbard squash had been grown in the vicinity for a number of years tends to corroborate the above view. When first found it was growing in a field of pure Essex Hybrid squashes. Three very even sized squashes of about ten pounds' weight each were growing upon a single vine within the space of three feet. It is a singular fact that the original vine of both the Essex Hybrid and Bay State had each three squashes growing on the vine within the length of three or four feet, and almost identical in form and size, the only apparent variation being the color. The color of the Bay State was distinct from every other squash then known, being a blue shade with a peculiar greenish tinge. Another point that seems strongly to sustain the foregoing theory is this: no matter how careful and particular you may be in selecting your Bay State colored squashes for seed, you will find more or less sporting back to the Essex Hybrid in color, but the same shape always retained. The prominent points of the Bay State are these: earliness and quick maturity, great productiveness, good keeping, and first-class quality.

As a late winter squash the Hubbard takes the front rank. It is a later variety than either of those noted, and should be planted as early as possible after the season is warm. This choice variety

was introduced many years ago by Mr. Gregory, of Marblehead.

Three years ago I found in my Boston Marrow squashes a peculiar sport — a squash having marked characteristics of the Boston Marrow at the stem and terminal point, and the singular wrinkled markings only to be seen on that variety. The color of this sport is a dull green, unlike any other I ever grew. I have grown it for two seasons, and find it to be of excellent quality, fine grained, and very sweet. In its sporting for the two seasons I have grown it, it has shown only its Marrow parentage. In the coming season I am in hopes to establish it as a distinct and valuable variety.

I do not think that in the entire list of cultivated vegetables there is another so hard to preserve in purity as the squash family.

From the peculiar formation of the blossoms of this family of plants they are not as readily fertilized by the wind as are many others. But to remedy this defect Nature has furnished another way, by means of the bees that are continually passing from one blossom to another, the fine pollen dust adhering to their legs and bodies, and being thus carried from one field to another quite distant. Therefore, although we may isolate fields of squashes as far from other fields as possible, we are not sure but we may have more or less of this cross-fertilization by the bees, and the very means by which Nature insures the perfect fertilization of the blossoms may be the chief cause of the sports and crosses so common in squash culture, and by which new varieties can be multiplied at will.

During the summer and early fall there is quite a large demand in the market for Melons, and on land adapted to grow good melons they are often very profitable.

To grow melons to perfection requires a warm, rich soil, with plenty of nitrogenous manure, to give the vines a strong, vigorous growth. To have melons early in the season the seed should be started under glass in pots or small plant boxes made for that purpose and transplanted from them to the open ground in June. A hot, dry season is better adapted to produce melons of good quality than a season like that of 1897. The past season was particularly unfavorable for the melon crop both as to quality and amount. On an experimental piece of Improved Orange

Christiana, where a fair crop would have been one hundred boxes, but fifty were produced. One gardener who put out eight thousand hills, started under glass, had a complete failure, not selling a single box.

A few years ago I planted half an acre of Early Christiana melons on the eighth of June, following a crop of spinach. A special vine fertilizer was used in the hill. From the half acre we picked two hundred boxes and sold them at an average price of $1.25 a box. The season was hot and dry, a favorable one for melons.

Of the different varieties Extra Early Hackensack, Montreal Nutmeg, and Arlington Nutmeg of the green fleshed, and Improved Christiana, Emerald Gem, Shumway's Giant, and Tip Top of the salmon fleshed kinds, are the most desirable.

In some markets the green fleshed melons are most in demand, but the salmon fleshed are considered the best flavored.

I have no doubt that it is within the memory of many of those present when the Tomato was introduced as an article of food. It was used at first as an ornamental plant in the garden, from the beauty of its bright red fruit, and was called "Love Apple."

At its first appearance its fruit was rough and ill-shaped, and but a small portion was fit for market. It soon became more widely known, and was called for to use in various ways upon the table.

Its cultivation increased rapidly, and the demand for seed infused into the heart of every seedsman a desire to improve the varieties then known, by bringing out new ones as improvements on the few kinds then cultivated.

There soon appeared many new tomatoes, said by the introducers to be superior in earliness, smoother and better in shape, more solid in flesh, and of finer flavor and quality than any kind previously known. Among them were a number of decided superiority in all of the points of a first-class table tomato.

One of the first improved large tomatoes was the Trophy. This was a very large, solid fleshed, red tomato, of excellent quality, but not coloring well around the stem. In 1860 the Essex Smooth Round tomato was brought out. This variety is of medium size, bright red color, always smooth and handsome, and is at the present time one of the best forcing tomatoes known. In 1870 the Paragon was introduced, and has proved an excellent tomato.

In 1874 I produced the Essex Hybrid, the first large purple tomato known. This was a cross between the Essex Smooth Round and Lester's Perfected tomato. After proving this variety for three years, and finding it to be first class in every respect, I introduced it to the public in 1878.

It has proved wherever grown to be one of the best and most profitable tomatoes in cultivation.

In 1875 the Acme was introduced by Livingston. This is a smooth purple tomato, of good quality, but inclined to spot with black rot on the fruit. Livingston brought out successively the Perfection in 1880, Beauty in '86, Stone in '91, Royal Red in '92, Buckeye State and Dwarf Aristocrat in '93. All of the above are excellent varieties. The Stone is a large late tomato, handsome in shape and color, of first quality, and one of the best varieties known.

Dwarf Aristocrat is of a different class — one of the dwarf varieties, having a stout upright vine, and can be set nearer together than the larger growing vines. The tomatoes are of a bright glossy red color, early, of good size and shape, and of fine quality. I shall place this as one of the best.

In 1892 I had the honor of bringing out a new early tomato, the Comrade. The experience of many prominent gardeners in different parts of the country has proved this to be the most profitable early tomato grown. The fruit is of good size and shape, of bright red color and fine quality, and remarkably free from the black rot, a serious trouble with many early varieties.

I have another late variety which I originated a number of years ago, the G. A. R. tomato. This is a very large, round variety, remarkably solid in flesh, of a bright glossy red color, and of exceedingly fine quality. In my experimental plot of some thirty odd varieties this was the most uniform in size and shape of any. As a late tomato there is no other variety which will produce as large a yield of first-class tomatoes as this.

A few years ago a new tomato was introduced by a seedsman in Philadelphia as the earliest, largest, most productive, and handsomest tomato known, and far superior to every other variety in cultivation. In thoroughly testing this tomato, the New Imperial, for two years I find it not as early as represented, but in many respects all that was claimed for it.

There are many other tomatoes of merit cultivated in various

parts of the country, but to the market gardener the above specified varieties are as good a selection as can be made, as he can choose from them either the bright red or the purple varieties, as the fancy of his customers may call for them.

Within the last few years there has developed in a number of sections of this country a disease or blight which appears upon the tomato vines, and which I fear may prove a serious trouble.

After its first appearance in July it spread so rapidly that it ruined many vines, and greatly damaged the crop.

From the experience of the past season I think we shall be obliged to take measures to prevent the blight on our tomato vines in the same manner that we do on our potatoes.

As I usually grow tomatoes largely I shall take the precaution, the coming season, to spray with the Bordeaux mixture, before the blight makes its appearance, trusting to a thorough application to prevent its getting a foothold. Still I am fearful that the easy cultivation of the tomato has passed by, and that in the future we shall be obliged to watch our tomato fields as sharply as any crop we grow.

The tomato can be improved by two methods. If new varieties are desired, then by cross-fertilization, and planting the seed thus fertilized, and from its product selecting the best types of the qualities desired. Training those for a number of years, you can establish new varieties.

The other method is by selecting the most perfect fruit for a number of years, following on that line persistently, until your object is accomplished.

In this manner new varieties can be produced from all classes of vegetables, simply by following the laws which Nature has made to attain given results. There is a peculiar fascination in the evolvement from the multiplicity of Nature's crosses of a new variety, and the establishing of such, with fixed and permanent qualities, thereby adding another kind to the food products of the world.

One of the most important crops produced in this country is Indian Corn. In all the species of grain or vegetables cultivated there is none more interesting in its manner of growth than this. In the manner of producing its crop this plant is unlike most others, having two distinct flowers, male and female, on the same stem.

The male flowers are in a panicle on the top called the tassel, and the female flowers in a spike on the stalk below, called the ear. The silk consists of the pistils of the female flowers.

When the tassel is in blossom the pollen dust falling on the silk of the ear is transmitted by a tiny thread of silk to each and every kernel on the ear. If not thus transmitted the kernel is abortive, and fails to mature.

A very interesting experiment to demonstrate the method which Nature takes to produce new varieties by cross-fertilization can be readily made by any one by planting two rows of sweet corn, of two different kinds, beside each other. To have the result more distinctly shown, plant one row of the black Mexican variety and the other of a white variety, such as the Crosby, coming into tassel at the same time.

On ripening, you will find the ears of the black variety with kernels of the white corn, and the white ears with kernels of the black; also some kernels apparently partaking of a mixture of both.

This experiment will show how unerringly Nature's laws act to produce given results, and that with all varieties of vegetables this wonderful process of reproduction is continually evolving new forms and varieties before unknown. Where the pollen of one variety falls on the silk of the other, the kernel connected with that silk will be changed by cross-fertilization.

If any one desires to attempt to produce new varieties let him study into the methods which Nature takes to perform her wondrous works, and the better he can understand the working of her unchanging laws, and infuse into his own soul the inspiration of that wondrous life that lives on every hand, the more will his success be assured, and the more complete his triumph.

Discussion.

The Chairman said that he considered the subject of originating new varieties of vegetables a very important one, and spoke of where the new varieties come from. He thought Middlesex County farmers considered that most of the new sorts had come from there. He took pride and pleasure in the large number which had come from Essex County. The first Marrow squashes brought into the Boston market grew in Swampscott, from seed

raised by his father. The Hubbard squash was found in the garden of Old Mother Hubbard, in Marblehead, and introduced by J. J. H. Gregory. The standard variety of cabbage known as the Mason also came from Marblehead; it was improved by a neighbor of Mr. Mason's, and then called the Stone-Mason cabbage. The Danvers onion was perfected by David Buxton, of Danvers, now Peabody. The Danvers carrot was grown by Nathan Bushby, of the same place. The Marblehead corn was introduced by J. J. H. Gregory; it is very early and unfit for eating, but will do to sell. The Crosby corn was originated in Marblehead, by Mr. Wyman (who moved to Cambridge) and perfected by the late Josiah Crosby at Arlington. Many other varieties have come from Essex County. It is an honor to the county to have developed standard varieties of vegetables which are the leading kinds in the country. Among other varieties from the vicinity of Boston is Fottler's early cabbage. At one time the seed of this variety literally brought its weight in gold. Its origin is somewhat doubtful.

Mr. Low said that onions are different from other vegetables; all are improved by selection of old sorts rather than by new ones from seed. Mr. Buxton has increased the depth and measuring capacity of the Danvers onion, retaining the quality. A friend sent the speaker eighty beans, the handsomest he ever saw; they were all marked alike, and he planted them in a cold frame; the result was more than twenty distinct sorts, so he gave up attempting to improve the variety. They had been cross-fertilized, and could not be trained to a fixed variety without years of work. Potatoes are improved by selection.

Rev. Calvin Terry said that when a boy he planted potato seed, and got potatoes which were the same as the parent; afterwards they changed and he thought that they mixed in the ground. He asked whether potatoes mix through the seed alone or through the tuber.

Mr. Low did not think that they mixed in the tuber; the seed might have been influenced the year before. There is no mixture except through the flowers. The potatoes we grow now seldom flower well, and we are not likely to have seed balls. It is not in accordance with nature that potatoes should mix in the tuber.

Samuel H. Warren asked: Why not as well as corn the first year?

Mr. Low said that the corn kernel is the seed; the potato tuber is not. The squash will not change the first year, but will become more developed than either parent. Corn develops seed the first year. You might plant some of the white kernels which were on the Mexican Black ear when crossed with the Crosby as suggested in the lecture, and the result would show a great variety, easily seen, as the colors can be distinguished.

Varnum Frost questioned whether these crosses had improved the eating qualities of the squashes, and spoke of the poor quality of the Marrow and Hubbard squashes of today.

The Chairman said that the Boston Marrow does not compare in quality with the original, which was smaller, seldom weighing over eight pounds. The Boston Marrow now grown, being larger, gives a better crop in weight, but not in quality. It is sold by the ton, and that is why they have deteriorated. The old-fashioned Marrow is just as good now as it ever was. The Danvers onion is not of the first quality, as the two outer layers are thick and tough and unfit to eat. The smaller ones do very well. It is a good onion to sell. The Cracker onion is much superior in quality. It is tender and delicious, but too delicate for transportation.

Joshua C. Stone did not want people to go away thinking that every good vegetable originated in Essex County. The hybrids have ruined the market. In old times a man would buy a barrel of squashes and carry them home and eat them.

George D. Moore thought that the growing and fertilizing have a good deal to do with the quality of squashes: we cannot grow good ones in old gardens; you want new sward land to get them of good quality.

Mr. Low said that nitrogenous manures produce great quantities of vine, but squashes of poor quality. Squashes are grown today not so much for quality as to get good crops to put on the market. The poor quality is due to the cross-fertilization; different varieties of squashes grow side by side, and the variety deteriorates.

Mr. Frost said that Livingston has sent out too many varieties of tomatoes. You can take a dozen of his varieties and mix them together and then you cannot pick them out. He asked why this was.

Mr. Low replied that he did not know whether you could elimi-

nate this undesirable quality that has been brought out or not. Of two white potatoes no difference in growth can be seen until flowers appear. In one the flowers are white, in the other purple; the tubers are both white. In tomatoes a casual observer might see no difference, but a difference may be distinguished in the calyx, etc.

O. B. Hadwen asked whether squashes can be improved by thinning. They are now almost unfit for eating, owing to the inferior quality.

Mr. Low was inclined to the opinion that the quantity of the fruit would be increased, but the quality would not be improved. Eliminating too much moisture would probably do that. In a dry season the crop of melons is small, but the quality is much better thre in a wet season.

Mr. Warren thought he had gained a point in the discussion. He had planted seed from the second crop of Enhance strawberry, a late variety. To his great surprise the new seedling was to all appearance the same as the parent. He accounted for it by there being no other kind near.

Mr. Low said that you must have some other variety in pollen at the same time. There were no other strawberries in bloom. Potatoes will vary if not cross-fertilized, but if you wish to fix any particular point you must fertilize with pollen of the variety possessing that quality.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 29, 1898.

A meeting for Lecture and Discussion was holden today at eleven o'clock, Vice-President BENJAMIN P. WARE presiding.

The following lecture was delivered:

NUTS AND NUT CULTURE.

By FRANK M. BARTRAM, Parry, N.J.

In 1897 the United States imported over $2,200,000 worth of nuts. When we consider that most of this expenditure was for kinds that may be easily and abundantly raised within our own borders it does not speak well for our boasted enterprise. It seems incongruous to say so much of opening up and fostering markets

abroad for the agricultural products of the United States when we ignore the expenditure of our own people going to foreign purses. It is the varieties of nuts that enter most largely into United States commerce and consumption that we will consider here — those whose culture has already become a reality in some part of the country. The industry is comparatively young. It is scarcely thirty years since nut culture has assumed commercial importance. The Almond and Persian Walnut in California, and the Pecan in the South, are in the advance of the movement. Much interest is being taken in Chestnuts throughout the Atlantic States.

The claims of desirability of nut culture, beside the enticing profits, are numerous. The doctor and the lawyer depend for their livelihood upon the misfortunes of others, while the nut culturist is ever happy in contemplating the joy and good will attending the use of his product. Trucking requires ground of great fertility, and suitable for high culture; nut trees are not fastidious, and hillsides are often their home. Truck must be planted annually, while a nut orchard might almost sing with Tennyson's brook, "Men may come and men may go, but I go on forever." Nuts are not perishable; they may be stored and marketed at one's pleasure or need. They are a concentrated product, the freight charges on which are much less in proportion than on more bulky products. Not requiring constant and detailed attention, they will appeal to the large planter; while on the other hand these virtues will suggest nut culture as a side issue, for on many farms land is found, now unremunerative, admirably suited to nut trees, especially hillsides, and here the forester's attention will be arrested.

In the first place we are aware of the benefits of forests, principally in moderating extremes of flood and drought. Many kinds of nut trees are adapted to forestry planting, and their timber is highly esteemed; for instance the oak, beech, chestnut, hickory, and walnut, and even the hazel bush finds a place as a pioneer in soils too barren for other trees, and by rapidly adding organic matter in the abundant crop of leaves prepares the way for the more valuable timber trees. In a monograph on forestry prepared at the request of the Governor of Pennsylvania a few years ago, every deciduous tree named is a nut bearer. And forestry should commend itself to owners of the many hillsides in which New

England abounds, so well adapted to this, while so poorly suited to many branches of agriculture.

The ornamental value of certain nut trees is so very far beyond question that thoughtlessness and custom alone must be held responsible for depriving us of so much possible enjoyment of beautiful trees. I know I am treading on dangerous ground even to intimate anything disparagingly of the elm to New Englanders, but when in Boston last summer the contrast in the appearance of the foliage between the elm and the beech was not to the discredit of the latter. The elm has ever belonged to that class of trees that bears "nothing but leaves, nothing but leaves," and the imported beetle is vigorously attacking even this glory.

Large and spacious grounds about a home are in sad minority. The area is limited that surrounds the vast majority of homes, and the suburban home for the man of moderate means is now anxiously sought for and frequently acquired. He wishes to adorn his surroundings with choice trees, and if he will plant a chestnut or hickory (or, where they will thrive, a Persian walnut or pecan) he will have a tree of whose appearance he may be justly proud, and whose fruit will be a source of continual pleasure to young and old. In parts of France the chestnut trees about the home furnish much of the food for the family, and the surplus is sold.

The Cocoa nut is the fruit of a stately palm, growing to a hundred feet in height, and a foot in diameter, unbranched. The leaves are at the top only, in a whorl; each composite leaf is from fifteen to twenty feet long and three feet broad. From the axils of these spring the spikes of blossoms, which come in succession, so that at any time the tree has fruit in all stages of development. Some trees are claimed to bear as many as three hundred nuts a year. The area suitable to its successful culture in America is small, confined to parts of Florida.

The Hazel is another common nut not yet submitting kindly to American culture. The Puget Sound region is the most promising locality. The hazel is subject to a blight; and the lack of simultaneous blooming of staminate and pistillate flowers and lack of pollen induce some to get branches of wild varieties to tie in bushes at home, or to plant a wild bush in a cultivated orchard.

The Indians of the Southwest use the nuts of a species of pine

as food or for a relish. Roasted like peanuts they are said to be delicious.

The Leechee nut has a round rough brown casing over an edible pulp. This is whitish, but becomes brown when the nut is kept for some time. In the centre is a single seed. The fruit is very popular in the Orient and may now be procured here. It is called also the Chinese nut. Trees of it are growing in Florida and California.[1]

The Ginkgo, or Maiden Hair tree, from Japan, is of upright, very narrow growth; as an ornamental tree it is of a high order. It is hardy at Boston and free from insect pests. The nut is of inferior quality, but is sometimes used for food when roasted. The outside fleshy covering is very acrid.

Foremost in acreage, value, and ease of bud propagation among American grown nuts stands the Almond, and American grown almonds are foremost in the world as regards flavor. California is the main field of production. In 1896 her product was 912,300 pounds. The almond is closely related to the peach; in fact the hard shell variety bears too close a resemblance to a peach pit to be of pomological value except as grown for pharmaceutical purposes, or the tree may be used as a stock upon which to bud peaches, as it is exempt from attacks of the borer. The Soft Shell almond has not proved a commercial success outside of California, except perhaps in parts of New Mexico, not being hardy in the North and the blossoms being injured by frost in the South. The trees are budded upon the peach in the same way as peaches are budded, and treated in much the same way, being set at about the same age and at about the same distance apart. The almond comes early into bearing, reaching full bearing age at from six to seven years. Reports of average yields vary from five to thirty pounds per tree. Harvesting is often accomplished by spreading canvas on the ground and shaking the tree. After the removal of any parts of the hulls adhering when the nut is gathered, the nuts are dried, and sometimes bleached, and are then ready for market.

Next to the almond in acreage and value among nut crops in this country stands the Persian Walnut. Its origin is in Persia,

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[1] Fruit of the Leechee or Litchi (*Nephelium Litchi*) was exhibited by Charles Amory, of Boston, at the Rose and Strawberry Exhibition of the Massachusetts Horticultural Society, June 26, 1883. It was raised by Mr. Amory at Sanford, Florida. — Ed.

the home of the almond and peach. Carried to Europe by the Greeks, it was passed to the Romans, who carried it to England, where it was named walnut, signifying foreign nut, while in America it has been called English walnut, though the more appropriate appellation "Persian" walnut is becoming more common. In California alone has this nut been cultivated upon a profitable scale in America. The largest reported orchard is of 700 acres, and the crop in 1896 sold for $139,360.

The rich moist valleys of Southern California, with steady supplies of water, have claimed a monopoly of suitable environment, but by the selection of varieties whose buds start late in the spring the area of profitable planting has been increased. Most of the orchards are yet of seedlings, planted from forty to fifty feet apart. These begin profitable bearing at nine or ten years, and no one knows how long they continue so. A tree is reported from France three hundred years old, yielding now fifteen bushels at a crop. No spraying, worming, or fumigating is yet necessary, and very little pruning is done; but walnut orchards are like all others in rewarding their owners for good tillage. In the early fall all brush and litter are cleared off the ground preparatory to harvesting. We have been told of a European practice of thrashing the trees with fishing poles as not only common but extolled as a means of inducing the setting of more fruit buds. This method is not generally followed in California. Gangs are started out to pick up the nuts when they have begun to fall, usually going over the orchards four or five times at intervals of a week. The nuts, after the hulls are entirely removed (sometimes portions of the hulls remain on the falling nuts), are spread on trays for drying, being frequently stirred to prevent heating. In about three days they are ready to be marketed in the usual one-hundred-and-twenty-pound sack. Some growers kiln dry their product. Much care is necessary in curing, as nuts improperly cured soon become rancid. Sometimes sulphur fumes are resorted to for bleaching. The nuts are usually graded, and in France much inferior material is consigned to the oil mill, where a superior culinary product is obtained. There are several names that distinguish strains rather than precise types, as propagation has thus far usually been by seed. Many of these are of French origin, among which we might mention the Chaberte nut, rather small, rich in oil; the tree is not so fastidious as regards fertility

of soil as some others. The Ford, with a very soft shell, and a good keeper. The Franquette, of good size, kernel plump and choice, late in starting growth, hardy. The Gant or Bijou, shell very large, — unnecessarily so for the size of the kernel, — so called on account of the shells being used for handkerchief or jewel cases. The Kaghazi, with a very thin shell, late in budding out in spring, and an early bearer. The Mayette, the choicest of its class, bringing the highest price in the market, having large, plump kernels; late in starting out. The Mission, medium in size and thickness of shell; it has been largely planted, but is likely to be superseded on account of its early budding out, lack of simultaneous blooming of male and female flowers, and slowness in ripening up its wood in the fall. Prœparturiens, very precocious and productive; rather dwarfish; its nuts possess signal advantages over the last named in every way. Santa Barbara; so thin is the shell of this variety that some damage is done in shipment; it is about ten days later in budding out than the Mission, an early and regular bearer and moderate grower; hence it may be planted closer than Mayette, Parisienne, and others.

There might be mentioned here the Chili walnut, a name applied to nuts received from South America late in winter; kernel plump, quality good, much like the kinds just named, except that very frequently the shell is in three divisions instead of the usual two of European strains.

Outside of California the Persian walnut is very rare, except along the Atlantic coast, between New Jersey and Carolina. It may be found as far north as Massachusetts. In Florida the roots are attacked by the worm that so destructively causes root knot on fruit trees there. This might be overcome by grafting on the black walnut. In the East the Persian walnut may not become a profitable orchard tree, but its stateliness, beauty, and freedom from disease and insect pests, heartily commend it as an ornamental tree, and its product will be much enjoyed at home. Disappointment has often resulted on account of the deficiency of pollen and the lack of simultaneous blooming of the pistillate and staminate flowers. A remedy for this will be found in planting together suitable varieties.

There is a native California thick shelled walnut used there for stocks upon which the Persians are grafted for the purpose of dwarfing them and hastening fruiting. The Pacific coast Black

Walnut is very precocious in Philadelphia, where an eight-foot tree bore fifty nuts, but it has no other merit. The American Black Walnut has been much gathered in the East for home cheer and sold in considerable quantities at from one to three dollars per bushel. The only reason for prizing these nuts that I can see is because of custom; they are common and keep well with little care. The kernel is so intricately incased in such a thick shell, admirably adapted on the outside to picking up grains of sand to mix automatically with the kernels, that these nuts will surely be superseded as soon as we get familiar with something better — improved hickories, for instance. Sound old trees furnish timber most highly esteemed, and many are urging the planting of black walnuts for this use. The rich dark color, which makes the wood so valuable, is not present in young trees, and some say does not develop until the tree is nearly a hundred years old. If one should wish to plant black walnuts for timber purposes he will probably get one or two year trees which may be quickly planted, perhaps with a crowbar, about nine feet apart each way, surrounding them with fast growing trees like Japan walnuts, red maples, or mulberries to prevent low branching. The pollen is said to be potent for Persian varieties.

The White Walnut or Butternut thrives in dryer and poorer soil than the black walnut, and further north. The nuts find also a place in confectionery, but are hard to separate from the shell, and the wood is not nearly so valuable for timber purposes as that of the black walnut. Both may be used as stocks upon which to graft the thin shelled Persian varieties. This fact will doubtless be appreciated in Florida, where these native species are free from the attacks of the worm that so damages the Persian walnuts by root knots.

Closely resembling the butternut in the appearance of the tree, more vigorous in growth and more luxuriant in foliage, are three varieties of eastern Asiatic walnuts, called Sieboldiana, Cordiformis, and Mandshurica. The last named is from China and Korea, and the nut so closely resembles the butternut that it needs no further mention. The Sieboldiana, from Japan, is smaller than the Madeira, though it looks not very unlike it. It has a thicker shell with a smaller kernel, of slightly inferior quality. The shell is much thinner than that of the black walnut; the meat is much more easily extracted, and the tree is handsomer. The Cordifor-

mis, also from Japan, is by far the most valuable of the three. The name is suggested by the pointed heart-shaped form of the nut. This is flat and smooth, and by a single tap the shell separates into halves, and the nut is readily extracted whole without being mixed with sand and bits of shell. The kernels are of good quality, and are already prized by confectioners. Like the Sieboldiana, the nuts are borne in clusters at the extremities of the previous season's growth. The trees bear very young; I have seen many clusters on trees three years from seed. Mr. Luther Burbank says they are more regular and abundant bearers than the Persians in California. Coming from the most northern parts of Japan, they would be expected to be hardy in most parts of this country, and this is confirmed by experiment. So eminent an authority as Mr. Burbank declares them to be "as hardy as an oak." They are rampant growers; on a tree three years from seed I have measured on the leader a growth of ten feet made that season in New Jersey. Long composite leaves of most luxuriant appearance, always free from disease, make the tree most desirable as a shade tree, while in winter the trees are so open as to admit the then cherished sunshine. I am persuaded that the Cordiformis is destined to become deservedly popular in America.

The Bulletin of the United States Department of Agriculture on Nut Culture says in regard to the Pecan, "With the area of special adaptation in the United States, considerably larger than is found for either the Persian walnut or almond, and with a susceptibility to improvement by selection, in size of nut, thinness of shell, and delicacy of flavor that are very encouraging to those who have attempted this work, the pecan is probably destined to become the leading nut of the American market. If its culture is pushed with the usual skill and energy of American enterprise there is reason to believe that it will not be many years before the pecan will become not only an abundant nut in our markets, but also an important article of export."

The widespread attention and energy addressed to pecan culture along the Mississippi river and its tributaries as far as Iowa and Ohio, and the salutary results obtained, are surely bearing out this observation and opinion. Florida and California hasten to tell of the successful prosecution of the industry within their borders, but it is the alluvial bottom lands along the rivers of

Louisiana, Texas, and Mississippi that are the headquarters of the pecan culture of the world, and seem destined to maintain this prestige. The pecan is entirely uninjured by a periodical overflow of the land, having even endured as much as three feet of water for a week. Near the Gulf, where the period of inundation is longer, the pecan succumbs.

The accounts of the amazing profits of pecan culture in these regions are enough to turn the head of Horace Greeley's weathercock and make the sage of Chappaqua's injunction run "Go South, young man." A Texas correspondent of "Farm and Ranch" writes: "If at the birth of a son one would plant only twenty acres of good land in pecan trees, and set it aside for him, that boy at twenty-one would have an income of $5,000 a year and merely the trouble of picking it up." The industry has been so long established that we depend not merely upon the prattle of some visionary, or the expectation of a theorist, but horticultural literature is replete with the testimony of men of unimpeached integrity as to what has been accomplished. W. R. Stuart said in an address before the Mississippi State Horticultural Society in 1891: "It is desired to refer to one tree of the variety known as the Stuart pecan, soft shell, which has yielded this year over two hundred and fifty dollars' worth of nuts at the price readily obtained for them." As early as 1871 reports came that the pecan crop was worth five times as much as the cotton crop in some sections that year. The statement is widely circulated that in 1880 San Antonio alone shipped 1,250,000 pounds of pecans, worth from four to six cents per pound on the wagons. Many orchards are of selected seedlings, but advocates of this are acknowledging that as their orchards come to bearing they are not nearly so sanguine as before. Root grafting, crown grafting, and annular budding are successfully practised to propagate to a certainty desirable varieties, several of which are named. The qualities most sought for are large size, thin shell, plump, full kernel of good flavor, and productive trees coming early into bearing. Seedling trees have usually come into profitable bearing when about ten or twelve years old, increasing for a score or more of years, and continuing proportionately long. From ten to twenty bushels are expected as an annual crop from a tree of full bearing age. A report states that a wild tree has been known to produce more than a thousand pounds in one season. Except that it

comes so frequently, and upon such good authority, I should not dare repeat the statement, that in times past, in gathering the nuts, trees have been cut down to get the nuts quickly and at once, but such vandalism and short sightedness is too absurd to be abiding. Mr. F. A. Swinden, Brownwood, Texas, who claims the largest pecan orchard, has thought of using street sweepers to collect the nuts into rows. No especial care is exercised in curing. The small nuts are fed to pigs or consigned to an oil mill. There is trade existing for the shelled kernels; one firm alone, in 1890, sold over a hundred thousand pounds of kernels in halves; they sold for from forty-five to fifty cents per pound.

Closely allied to the pecan botanically, and closely resembling it in the appearance of the tree, is the Hickory nut, or Shellbark, — too familiar to need much description. We know of the difference in size, shape, and flavor of nut, thinness of shell, and ease of extracting the kernel. Owing to the remarkably poor success heretofore attending efforts at bud propagation, I know positively of but one grafted variety offered for sale, the Hale's. The original tree of this, probably considerably over a century old, is at Ridgewood, N.J. The nut is of good size and quality, and of exceptionally thin shell. It surely is an abiding wish with me that a large measure of the success attending the culture of the pecan in the South might be visited upon her cousin in the North, and it probably will be as attention is directed toward the industry. The tree is desirable for lawn or roadside planting; the nuts are salable, and the timber valuable.

There are several reputed hybrids between the pecan and hickory nuts, the most renowned being known as the Nussbaumer Hybrid. The original tree, standing in Illinois, is about fifty feet high; the nuts that I have seen closely resemble the pecan in appearance.

From a commercial standpoint the Chestnut for this vicinity seems to me by far the most promising of nuts. We know the tree thrives and bears here, which are important factors already established. We know that a demand already exists for the product sufficient to consume not only all American chestnuts now offered, but many thousand pounds imported in addition. Ten thousand packages come annually to the port of New York alone, chiefly from Italy and France. They are mostly sold along the streets, much as peanuts are. Consider the vast increase possible

in this line! Consider the far greater demand when they become as frequently used as desserts and relishes as their merits deserve! Mark the frequency with which the chestnut appears in newer cook books for stuffings, dressings, etc., and remember that chestnuts are even now found with vegetables upon that class of American tables that soon have innumerable imitators, and prepare for this demand, which is small indeed compared with the possible and probable consumption when chestnuts are dried, ground into flour, and become the staple article of diet that they have so long been in Southern Europe. Not only chemistry, but what is of far greater practical value, the experience of generations, has demonstrated the fitness of chestnut meal for human food.

Having noted that the tree will thrive and produce here, and that the market will absorb the product, consider some of the intermediate advantages of this crop. Chestnut trees do best on high, well-drained land, with open subsoil, — hillsides, for instance, in which New England so abounds. It is no objection that land is stony; chestnuts will not bruise in falling, as plums would. Once established, a chestnut orchard continues profitable for decades or even centuries. The famous chestnut tree on Mount Etna has been bearing annual crops for more than two thousand years and bears yet. Chestnut orchards have been likened to "a government bond: you cut off a coupon each year, while the principal is undisturbed." No protection and very little pruning are required. Peach trees must be wormed twice a year; chestnut trees never. No large fertilizer bills encroach upon profits. Chestnut roots go deep down into the earth, and pump up the fertility from far below the reach of annual crops. This kind of farming is surely a pleasant method of mining, and any one with Klondike fever may be spared privations, hardships, dangers, and exertion by having chestnut roots do his digging for him, while he is at home or about other occupations. An established chestnut orchard will yield as many bushels per acre as corn, and with little more than the expense of gathering. The Albion Chestnut Company sold the first of their crop in New York at the rate of $14 per bushel for Alpha; as the season advanced prices fell rapidly to $12 and $10, and to $7 and $8 for Numbo and Paragon. If farmers should get such prices for corn they would raise nothing else, one would think; while they have ignored a crop that would yield as much, selling for many times

the amount with much less annual expense; indeed, the annual expense is in almost direct proportion to the crop, while with corn your bill necessary to fertilize and prepare the ground, procure and plant the seed, cultivate frequently, and cut and husk the crop is about as much for a poor as for a paying crop.

Chestnuts do not require the constant attention and Sunday labor connected with dairying, and Sunday confinement has started more than one boy from the farm. They do not need to be gathered at a critical moment; a delay of a day or even of a few hours, or an untimely shower, may ruin a whole crop of cherries. If it does not suit you or is raining today, perhaps it will be better tomorrow; or if you do not wish to go out, send any one. Gathering chestnuts does not require especially skilled or expensive labor. Chestnuts are not perishable, like flowers, vegetables, or milk, neither do they necessitate expensive and quick shipments and prompt sale. They may be held in storage or shipped thousands of miles to your choice of markets. Every summer I have seen the sides of turnpikes from Philadelphia lined with tomatoes, string beans, egg plants, etc., that reached the city in times of glut or for some reason were not promptly sold and became worthless. In the case of black raspberries, for instance, the grower loses not only the cost of producing and shipping, but also the boxes. Chestnuts do not need expensive packages for shipping, nor are they bulky like hay. Mr. John R. Parry sent to Philadelphia a two-horse shelving load of tomatoes; a bag of chestnuts thrown upon the seat brought more money than all the truck on the wagon.

Many are deterred from embarking in nut culture because they think they have to wait so long for returns. As Colonel Stuart said, "My dear friend, will you not have to wait anyhow?" And are not the steady and abiding profits worth waiting for? But the fact is, you do not have long to wait. Mr. J. H. Hale wrote me, under date of Dec. 12, 1896, "We have Burbank's Early in the South grafted last spring, which made a good growth until mid-season, and then was checked for a while and started on its second growth; the first growth bloomed and produced some superb nuts; we picked handfuls of them along the nursery row only a few days ago." It is no uncommon sight at Parry's nurseries in New Jersey to see fully developed chestnuts along the nursery rows on two-year grafts, and thirteen burs have been counted in

the fall on a graft set the previous spring. A six-year-old Paragon tree was literally covered with burs.

An old tree top grafted produced a bushel of nuts the second year that brought ten dollars in Philadelphia. Are there not many old seedling trees in pastures or lawns that could be thus made easily remunerative? There are large areas of land where chestnut trees have been cut for timber, and the roots have sent up suckers which may be grafted to improved varieties. The vigorous root system already established makes a fine growth, and early returns may be expected. The Albion Chestnut Company of New Jersey has begun operations of this kind with ambition ultimately to treat a thousand acres of chestnut stump land in this profitabl emanner.

Those who had no such old trees or sucker land, but who realized the promising opening in chestnut culture, have planted seedling chestnut trees of American growing, and grafted them after they have become thoroughly established. The American seedlings can be grown at home, or purchased cheaply of leading nurserymen. With proper handling they can be transplanted with as much certainty as fruit trees. The other day I walked through an orchard planted a year ago with chestnuts alternating with pears and cherries, and saw in the six-acre block but three dead chestnut trees, but more than this of cherry trees planted at the same time by the same man.

It is surprising what an influence grafting has in hastening the setting of fruit, and if this were the only advantage it would be worth the trouble. But this is not the main reason for the practice. The more attention is paid to a kind of fruit, the oftener we observe improvement in seedlings, and it is to fix and perpetuate all the improvements that bud propagation must be resorted to. The plan of planting seedling chestnut orchards vanished almost before its coming.

There are three distinct strains of chestnuts: the American, European, and Japan. The American is the tall, stately tree with which we are so familiar; the nuts are small, usually fuzzy, and of the best quality. Very few selections have been made and propagated by grafting. The European seedlings are not usually hardy here; very few imported trees live to bear, but from the seed of those that have borne here have come a very popular class of chestnuts, including Paragon, Numbo, Ridgely,

Scott, and a host of other good kinds. These trees are characterized as being intermediate between the tall American and the compact Japan; the wood is heavy, burs large, nuts good sized and of good quality. There are three kinds of chestnut in Japan, and the largest and best variety is being largely planted in America, and the choicest seedlings named and propagated by grafting. The tree is a beautiful lawn tree, of compact, symmetrical growth, not so large as the American or European; the foliage is attractive and healthy, resisting a blight that sometimes attacks the other species. The trees bear remarkably young. Luther Burbank named one of his seedlings the Eighteen Months, because it bore eighteen months from the planting of the nut. The Japans are regular and good croppers of nuts of the largest size, borne in very small burs; nuts have measured seven inches in circumference. They are not usually of the finest flavor, but the large size, attractive appearance, and earliness in season of ripening make them most profitable. They will form a perfect union when grafted on American stocks.

Of varieties now offered to the public we should choose Alpha, very early; Reliance, a heavy yielder; Kerr, remarkable for having short spines and few of them; and Parry's Giant, of the largest size. It may be that in commercial orchards some features of the traditional nutting party will be eliminated. Instead of letting the nuts fall and hide among leaves and litter, it is not uncommon to send out men with buckskin gloves to pick the burs from the tree like apples. This is done for two reasons; first to save time in hunting for the nuts, which, in rough ground with much underbrush, would be quite an item; and second, to forestall and eradicate the chestnut weevil, which sometimes proves a discouraging pest. This insect belongs to the curculio family; the adult deposits eggs in the nut as soon as it forms, and as the nut matures it incases the egg, which hatches into the familiar grub about the time the chestnut is ripe. When full grown the grub eats his way out and naturally would go into the ground to complete the cycle of his life history. In combating the insect prompt gathering cannot be too strongly emphasized, in order to prevent the development and escape of the grub, whose progeny would menace the succeeding crop.

Trees or groves in proximity to native trees whose product is left without care will be ever threatened by the weevil. Chest-

nuts, in weevil infested localities, should be dipped in hot water, subjected to a dry heat, or treated with bisulphide of carbon to kill the grub, and hastened into market.

The Chinquapin is a bush found wild in great abundance in the mountains of Virginia and Carolina. It bears a great many clusters of little burs, each containing a pretty shining little brown nut resembling a chestnut, and of superior flavor.

In conclusion let me call attention again to the timber value of nut bearing trees. I am still more anxious that their ornamental properties be remembered, and especially by the owner of a home with but limited surroundings, who feels that so much of his earnings must be sacrificed upon the altar of utility. Let him not forget that there are trees as handsome as any which will yield each year a product desirable at home or salable anywhere.

Let me commend nut culture to the farmer who would increase his income. No one need be deterred because he has no large acreage to devote to nut orchards alone. There is surely on every farm room along lanes, in pastures, or on hillsides, for a tree which, while crowding out nothing now useful, will be an enduring source of satisfaction.

Discussion.

The lecture was illustrated with specimens of nuts of many varieties, and also twigs from various sorts of nut trees.

During the lecture Jackson Dawson asked what method is used for grafting nut trees, and what proportion of the scions take.

Mr. Bartram replied that Mr. Engle would use split grafting, but he thought tongue grafting better. The proportion which takes is very misleading, sometimes from 85 to 95 per cent.

The Chairman said that there was one point about the chestnut weevil which he did not understand. If you gather the bur before the weevil hatches, does it not hatch and work in the nut after it has been gathered ?

Mr. Bartram replied that in the immature nut we find the egg of the weevil; this hatches as the nut ripens, and the weevil, after working in the nut, leaves it by making a hole in the shell, through which it escapes. If we gather the nuts early, and submit them to a hot-water treatment, the weevil is killed while still in the egg.

The Chairman noted that the shagbark and chestnut were the

only nuts recommended for culture in Massachusetts. Mr. Bartram added the Japanese walnut.

The Chairman said that here in Massachusetts, where there is much useless land, we ought to grow nuts. They should be planted in orchards. Nuts and timber cannot be combined in forest growth, as the nuts will be confined to the tops of the trees. Seedling nut trees send down a tap-root very deep, which causes a good deal of difficulty in transplanting naturally grown trees. Nursery grown trees, which have been several times transplanted, do not have as long a tap-root, and can be easily handled. The speaker asked whether these trees send down a tap-root, and were thus as deep rooted as undisturbed trees.

Mr. Bartram said that they do. He had seen trees which had had their tap-root cut off for several successive seasons; they started a new one each year. Grafting is done on a piece of the root in the house, like apples, or done in the field as soon as the wood starts. The scions should be cut at this time of the year, and kept dormant by packing in sawdust in an ice house or cellar.

Rev. Calvin Terry thought that scalding would spoil chestnuts, and the flavor would be destroyed by early picking. He said that in his experience transplanted nut trees will not live. Now is the time to cut scions. He had done grafting much the same as with apple trees, but found it very difficult, and asked if there are any secret methods which we do not understand.

Mr. Bartram wished there were, and said that it is more difficult for experts to graft nuts than apples.

Joseph H. Woodford said that the nuts exhibited by Mr. Parry, of New Jersey, at the Annual Exhibition of Fruits and Vegetables of this Society last fall, were given to him. He found that one-half of them were full of worms; the good ones he sent to Kansas. Jackson Dawson has transplanted every kind of nut, and we know that nuts can be grown here. What we do want is to know how to prevent a loss of one-half of the crop after they are gathered. We must kill the insect before the eggs are laid; that is, while the tree is in blossom; success would then be sure. He asked whether there is any method of doing this.

Mr. Bartram replied that he knew of none. Hot water or dry air treatment of the nuts is the only preventive of losing the nuts after they are gathered. If you could gather up all the chestnuts in the land no new crop of insects would appear, but

this course is impossible. Native chestnuts are great breeders of this insect. Whether or not spraying will ever be applicable is a question.

The Chairman asked why the bearing of a pecan orchard of which the lecturer spoke was not satisfactory.

Mr. Bartram replied that the pecan was not satisfactory because the nuts did not all ripen up at the same time.

The Chairman asked whether that was caused by the orchard containing trees of several strains.

Mr. Bartram said that it was; it was a seedling orchard, and consequently the nuts ripened at different times and could not be gathered satisfactorily by sweeping.

The Chairman said that if they were grafted with some one variety the nuts would all ripen at the same time.

Mr. Bartram said he had recently noticed in passing through a new chestnut orchard of three hundred trees that only one per cent. had died. They were transplanted from a nursery.

Mr. Dawson had grafted all kinds of nuts, and found Hale's hickory very hard to handle. If it is easy to nurserymen, why do we not have more of them? He could not graft it successfully, but thought it the finest shellbark, if we could get it. He asked what the lecturer's experience had been with it.

Mr. Bartram said that it is one of the most stubborn nuts to graft, and hoped that we should discover some method which would succeed; until the nurserymen do we shall have to wait.

Mr. Dawson said that Mr. Fuller spoke of the stubbornness of the hickory in regard to grafting. There should be some free stock in all kinds of trees. *Carya alba* has wood that is very hard and firm. The wood of the butternut is the most free of all the nuts. If they are grown in four-inch pots and used for stocks, and the grafting done under glass, good results are obtained. There are few nuts hardy enough for commercial use. He asked why the butternut was not a commercial nut.

Mr. Bartram said that it was too hard to get at the meats, and that although it is now used in confectionery he thought we should soon have something better.

Mr. Dawson thought that butternuts improved with age, and that after two or three years from the time they were gathered the flavor was much improved. Mr. Edward S. Rand had half a dozen nuts of *Juglans Mandshurica* from Japan, from which two

BUSINESS MEETING.

SATURDAY, February 5, 1898.

An adjourned meeting of the Society was holden at eleven o'clock today, the President in the chair.

William C. Strong announced the decease of Edward C. R. Walker, a former Recording Secretary of the Society, and moved that a committee of three be appointed by the Chair to prepare a memorial of him. The motion was carried, and the Chair appointed as that Committee Charles H. B. Breck, Mr. Strong, and Azell C. Bowditch.

The President spoke of the desirability that the Society give more attention than hitherto to forestry and kindred interests, and after remarks by several members it was unanimously

Voted, To appoint a Special Committee on Forestry, of five members, which shall give special attention to the subject of the preservation and improvement of the woodlands of Massachusetts; shall lend its assistance, so far as possible, in securing the planting of trees, and the preservation of those already planted upon the borders of the highways of the Commonwealth; shall secure, so far as shall seem to it expedient, the enforcement of the laws of the Commonwealth relative to forests and trees; shall with the approval of the Society, petition the Legislature for such changes in and additions to the laws as shall make them more efficient; shall submit to the Committee on Lectures and Publication plans for lectures, essays, and discussions on forestry subjects; and shall have authority, with the approval of the Executive Committee, to offer prizes for written contributions to forestry knowledge, not exceeding the amount which the Society may have placed at its disposal.

The President appointed the following named persons to constitute the Committee above provided for:

SPECIAL COMMITTEE ON FORESTRY.

Harvey N. Shepard, Chairman.

Nathaniel S. Shaler,	John G. Jack,
J. D. W. French,	James H. Bowditch.

The President stated that the Annual Report of the Treasurer

had been presented to the Finance Committee, who asked for further time, which was granted.

The Secretary laid before the Society a letter from Benjamin Lincoln Robinson, Ph.D., Curator of the Gray Herbarium of Harvard University, Cambridge, acknowledging his election as a Corresponding Member of the Society, and thanking the Society therefor.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were upon ballot duly elected:

Miss Helen Sharp, of Boston.
George Abbot Morison, of Cambridge.
Charles Maynard, of North Easton.
C. S. Harrison, of Roxbury.
George Mabbett, of Plymouth.
Harvey N. Shepard, of Boston.
Nathaniel S. Shaler, of Cambridge.

The meeting was then adjourned to Saturday, March 5.

MEETING FOR LECTURE AND DISCUSSION.

Saturday, February 12, 1898.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, Francis H. Appleton, in the chair.

The following lecture was delivered:

Some New Notions about Some Old Insects.

By M. V. Slingerland, Cornell University, Ithaca, N.Y.

For many centuries the insect world has afforded one of the most fascinating of all fields for observation by those who love to commune with Nature and to read her books. Most of those who speculate upon the various phases of that mysterious something called *life* get some of their most interesting facts from the insect world. Entomology, or the science of insects, is thus an old science and has had many devotees.

What is considered as the first entomology, or the first book devoted entirely to insects, was published in England, in 1634.

It is a quaint old volume entitled "Theatrum Insectorum." The authors, Drs. Penny and Mouffett, are said to have familiarized themselves with all that had been previously written about insects, and to have added much original matter, thus making the volume a compendium of what was known of these animals previous to the seventeenth century. Hundreds of busy minds during the succeeding two centuries found recreation in watching these interesting creatures, and their recorded observations have added much to our knowledge of the insect world. It is within the past century, however, that insects came to be studied from another point of view than that of mere love of the work or for "science's sake." It was not until about the beginning of the present century that the lives and habits of insects came to be studied with a view to discovering their most vulnerable points, that man may the more easily destroy them. In short, that phase of the study of insect life which has come to be known as economic or applied entomology is scarcely a century old.

The comparative youthfulness of this phase of entomology is not due to the fact that injurious insects were previously unknown. All are familiar with the biblical accounts of insect ravages, and many similar records are scattered through the succeeding literature. But previous to the middle of the last century most of the means used for the destruction of insects were of a spiritual nature, such as incantations, excommunications, and the like. During the latter half of the eighteenth century several books were published in Europe devoted to injurious insects, and especially to methods of combating them. Most of the recommendations, however, were mere guesswork.

In America nearly everything relating to insects has been published since the Revolution. There are many articles on such well-known insect pests as the peach borer, plum curculio, canker worms, and the Hessian fly, scattered through the early horticultural and agricultural literature. For nearly twenty years Dr. Harris published articles on injurious insects in the "New England Farmer." Finally he was induced, in 1841, to bring together the results of his wide experience and study in the form of a book, which has become a classic, and well-thumbed copies are usually to be found on the table of every American student of insect life. I refer, of course, to his "Treatise on Some of the Insects of Massachusetts Injurious to Vegetation." This simply, concisely,

yet beautifully written account of what the author had seen and learned about insects justly entitles him to be called the "Father of American Economic Entomology;" and the science of modern applied entomology may very well be said to have had its birth in America with the publication of this noteworthy volume by the State of Massachusetts.

The science has since made rapid strides in America. The earlier writings were signed by such familiar names as Harris, Fitch, and Walsh, and veritable mines of information are their reports. But the addition of Paris green and kerosene emulsion, and the modern spray pump and nozzle, to the earlier insecticidal batteries, soon revolutionized recommendations regarding the destruction of our insect foes. Thus the more recent writings of such well-known entomologists as Riley, Comstock, Cook, Lintner, Forbes, Fernald, and Howard have not only added much to our knowledge of the habits of insects, but their recommendations for combating them mark a great advance in the science, so far as it concerns the horticulturist. The establishment of experiment stations in nearly every State gave a great stimulus to the scientific study of agriculture, and in no other branch has this been more marked than in economic entomology. The working corps of many of the stations now includes a trained observer of insect life, and a great mass of literature has already resulted. But much of this material has been hastily compiled, the mistakes of earlier writers being oftentimes repeated, and is thus of little value. Good compilations, seasoned with common sense, have a legitimate place in our literature. The work has grown better each year, as the observers have become more skilful, and now there are many valuable additions to our knowledge of injurious insects coming from the press monthly in the form of experiment station bulletins. There has been too much guesswork in our recommendations for fighting insects. They are too often based upon insufficient knowledge of the life-habits of the insect, or upon the conditions under which the horticulturist must fight these little foes; and they are, therefore, either useless or impracticable. Horticulturists and others are fast realizing that in order to fight their insect foes to the best advantage it is necessary to know as much as possible about them. I usually find that those who control their insect enemies most successfully are the ones that know the most about them. Inquiries from such

horticulturists have stimulated workers in entomology to study our injurious insects with renewed vigor. The result is that the so-called "remedies" now recommended are more often based upon a more scientific and rational knowledge of the insect and of the horticultural conditions. We doubtless lead the world so far as improved methods for fighting insects are concerned. Paris green is only just coming into use in England and other foreign countries. The more progressive horticulturists now realize that the science of spraying has come to stay.

Climatic and other unknown conditions often cause a considerable variation in the habit and life of an insect. The same insect may pass through but one generation in a year in one locality, while in another State, perhaps only one or two hundred miles away, it will be double-brooded. It may lay its eggs on the fruit in one State, and on the adjacent leaves in another State. Oftentimes a very successful method of fighting an injurious insect depends upon some apparently trifling habit which may easily be overlooked. Recent additions to our knowledge of that old and familiar pest, the Codling-Moth, illustrate most of the facts above mentioned.

An entomological library which would include all that has been written about the injurious insects of the United States would occupy no inconsiderable space in any one of our great university libraries, and one would need several thousands of dollars to equip such a library. It must be remembered in this connection that much that has been recorded about our insect enemies occurs in the foreign literature. For, of the seventy-three insects of prime economic importance in the United States, the species each of which almost annually causes a loss of hundreds of thousands of dollars, only thirty are native, while thirty-seven species have been introduced, with six species of doubtful origin. Of the thirty-seven introduced species, thirty have come to us from Europe, all, with one exception, the gypsy moth, as accidental importations.

When one of our students first begins to study a certain injurious insect seriously, and fairly realizes how much has already been written about it, I am often asked: "Is it possible that there is anything new to be learned about this insect?" My experience in studying the habits of insects during the past few years has led me to believe that there is much to be learned

about some of those insects that we have thought we knew all about.

The present demand from horticulturists and others is for more detailed information, and this is resulting in the publication of many more careful and exhaustive bulletins and reports upon our injurious insects. Such bulletins are the ideal toward which most economic entomologists are striving as best they may with the facilities at hand. Whenever I make an exhaustive study of any insect, in addition to watching and recording every detail of its habits, I always find it interesting and profitable to examine what others have written about it. The discovery of the first published record of the insect, and the tracing of its subsequent history through many old and musty volumes, to discover by whom and when certain facts were added to our knowledge, has a peculiar fascination for me.

If there is any one of our common insect pests, about which we have thought that there was little new to be learned, it is the codling-moth. There was scarcely any change in our stereotyped biography of this pest for half a century or more previous to the present decade. In 1878 a practical fruit grower accidentally discovered that when he sprayed his trees with Paris green, he "not only rid the orchard of canker worms, but that the apples on the sprayed part were much less eaten by codling-moths." It was soon demonstrated by many experimenters that one could kill a large percentage of the apple-worms by applying a poison spray just after the blossoms fall. While this has been demonstrated over and over again, it will be found that the explanations as to just how the worms were killed by the poison are obscure, indefinite, and vary considerably. A horticultural friend, the late Professor Lodeman, after many careful experiments, satisfied himself that often at least seventy per cent of the apples that would otherwise be ruined by the worms could be saved by spraying. But he could not see just how it was accomplished, and often appealed to me for an explanation. I confidently expected to be able easily to find the explanation in the literature, but was surprised to discover that no definite observations had been recorded upon the habits of the newly-hatched worms; and it was only quite recently that any one had even seen the eggs of the codling-moth. I was thus forced to take up the study of this familiar pest. The results of two years' observa-

tions upon it, and a critical study of its literary history, is embodied in Bulletin 142, which has just been issued from the Cornell Experiment Station. My study brought to light, not only several interesting historical facts, but it has also resulted in some new notions about the habits of the insect.

It is said that Cato speaks of "wormy apples" in his treatise on agriculture, written nearly two hundred years before the Christian era. In the first century A.D., Pliny wrote: "The fruits themselves, independently of the tree, are very much worm-eaten in some years, the apple, pear, etc., for instance." While the apple-growers of these ancient times were doubtless familiar with the work of this worm, the real history of the insect itself apparently begins in 1635, or almost with the beginning of purely entomological literature. The first account appeared in a quaint Dutch volume by Goedaerdt. Nearly a century seems to have elapsed before we find the insect again discussed by entomologists. In 1746 a German writer, Roesel, recorded a very good account of the habits and life of the insect, accompanied by some colored pictures which have not been excelled since in color. Apparently the first English account appeared in 1747, and it was rendered especially noteworthy, since the author then gave to the insect the common name, codling-moth, by which it is today recognized by all the English-speaking peoples.

Although the codling-moth was doubtless introduced into America as early as the middle of the last century, it seems to have been first noticed in our literature in 1819. Mr. Joseph Tufts, of Charlestown, Mass., then published an account of rearing a moth, instead of the plum curculio, which had been thought to be the sole cause of wormy apples in America. Thatcher had made the same discovery when he wrote the second edition of his "American Orchardist" in 1825. This is apparently the first notice of the insect in any horticultural book, and although Europeans had been writing of it for nearly two hundred years, it is a curious fact that, so far as I can glean from the literature, it remained for this American writer to make the first suggestion for controlling the insect; he suggested scraping the trunks of the trees and applying a wash. Apparently it was not realized until 1832, when Dr. Harris called attention to the fact, that the insect which caused wormy apples in America was the same as the well-known European insect. The first American

picture of the insect seems to have been the one made by Miss Morris for the "American Agriculturist" in 1846.

The native home of the codling-moth, like that of its principal food, the apple, was doubtless southeastern Europe. It is now a cosmopolitan pest, occurring in nearly every corner of the globe where apples are cultivated. The British Columbian apple-growers seem thus far to have escaped its clutches. When once introduced into a country it spreads rapidly. What little evidence we have indicates that it spread more than half way across the United States in less than twenty-five years, reaching California in 1874. I believe that this single orchard pest not only levies, but collects each year, a tax of from two to three millions of dollars' worth of apples and pears from the fruit growers of each State where fruit is grown extensively. Beside the apple and pear, the insect sometimes attacks wild haws, quinces, plums, peaches, apricots, and cherries.

In nearly all publications, except those in the English language, this pest is now discussed as the "apple worm." While this very appropriate name is also often used by English and American writers, they usually discuss the insect under the perhaps less suggestive name of "codling-moth." It was thus named in 1747 by an English writer. As he figures a Codling tree (the name of a variety of apple tree) in connection with his account, this doubtless suggested the name. The word "codling" is doubtless a corruption of the old English word "querdlyng," meaning at first any immature or half-grown apple, but now applied to certain varieties of apples. At the present time most horticulturists and some entomologists are spelling the name "codlin." There is no etymological evidence in the latest dictionaries to support this dropping of the "g" from the old English diminutive suffix "ling." The scientific name of the insect, *Carpocapsa pomonella*, when translated is found aptly to express its characteristic habits; for the generic term comes from two Greek words meaning, "I eat greedily," and the specific name comes from the Latin word for apple.

All are familiar with the caterpillar stage of this pest, but not so many have seen the adult insect — the pretty little moth. Descriptions of the different stages of the insect are so readily accessible that it is not necessary to dwell upon this point. But there are some features peculiar to the male moths only, which you may

be interested to know about. It was long ago discovered that near the middle of the upper surface of each hind wing in the male there was a peculiar narrow pencil of rather long black hairs, slightly hidden in a furrow of the wing. While looking at the hundred or more bred specimens of the moth which we have in the Cornell University collection, I accidentally discovered that all of the males bore another much more conspicuous, yet constant and peculiar, mark. On the underside of each front wing of the males only there is a narrow, elongate, blackish spot, formed by a group of blackish scales. No one seems to have ever suspected that these spots were sexual characteristics. Thus one can usually determine the sex of a codling-moth at a glance, by the presence or absence of these black markings.

Perhaps the biography of no other insect pest has been written so often as that of the codling-moth. Begun in 1635, it was fairly well understood as early as 1746. And yet, I believe there are still many interesting things to be learned about it, before its biography can be considered as complete. About three weeks after entering the apple, it gets nearly full-grown, and makes an exit tunnel to the surface, closing the outside opening for a few days while it feeds inside. Emerging from the fruit, it usually makes its way to the trunk of the tree, where it soon spins a cocoon under the loose bark. Usually the first worms to spin up in June or July soon transform to pupæ, from which the adult insect emerges in about two weeks, and eggs are soon laid from which a second brood of worms hatch. In most of the more northern portions of the United States, only a part of the worms of the first brood pupate or transform to moths the same season, but in the central, western, and southern portions there is a complete second brood, and in some portions even a third brood of the worms annually. In the fall, all the worms spin cocoons wherever they may be, either in the orchard or in storerooms, and remain curled up in them as caterpillars until spring opens, when they transform, through the pupa, to the moth, thus completing their yearly life-cycle.

Mention of the egg or the habits of the newly-hatched worm was purposely omitted from the above brief summary of the life-story of the insect, because these are the phases of its life which are of vital importance to the horticulturist who sprays, and it is upon these that the most new light has been shed by recent inves-

tigations. The usual stereotyped statement, as taken from our leading text-book on entomology, has been: "The moth lays its eggs singly in the maturing blossom of the apple just as the petals fall. As soon as the caterpillar hatches, it burrows into the apple." Although almost every one who writes about the codling-moth glibly tells when and where the eggs are laid, it is a curious and striking fact that there is no evidence in the literature to show that any one ever saw the egg, as laid in nature, previous to 1889. The first careful observations upon the eggs, and the first picture of one, were published in 1893 in an Oregon Experiment Station Bulletin.

In the spring of 1896 I saw the egg for the first time, and was soon able to find many of them on the young fruits. They are thin, oval, scale-like objects, not quite so large as the head of a common pin. They have been aptly characterized as resembling a minute drop of milk. Instead, however, of finding the eggs where we have been taught for the past century and a half to look, that is, *in* or *on* the calyx, I have never been able to find any there, but I have seen them on the surface of the fruit *near* the calyx, in old curculio scars, near the stem, and even on the leaves of the tree. They were glued to the skin of the fruit or leaf, and being semi-transparent were not easily seen unless the apple was turned so that the light struck the eggs just right. During the past year the eggs have been found in Nebraska, "laid almost exclusively on the upper surface of the leaves adjacent to the fruit." Thus the commonly accepted notion regarding the egg-laying habits of the insect must be discarded. The eggs may be glued anywhere it happens — to the surface of the fruit, on the stem, or even on the adjacent leaves.

There has also been considerable difference of opinion as to *when* the eggs were laid. The common notion has been that they were laid about the time the blossoms fell. From the only definite evidence we have, based upon recent careful observations, one cannot escape the conclusion that, in the northern half of the United States at least, most of the eggs of the codling-moth are not laid until a week or more after the petals fall from most varieties of apples. The egg-laying period lasts for several days, and nearly a hundred eggs may be laid by a single female. Many apparently sterile eggs are laid. The egg stage usually lasts about a week.

It may be of interest to mention in this connection that I found several of these tiny eggs which had an unnatural black appearance. A few days later, instead of little apple worms hatching from them, there appeared in my cages fully developed adult insects, the surprising number of four coming from a single egg. It is wonderful to think of four perfect animals having been born in and having obtained sufficient nourishment to develop into perfect insects from the contents of such a tiny thing as the egg of the codling-moth.

The little apple worm breaks its way out of the egg near the edge, and then wanders about on the surface of the fruit until it finds the calyx, stem, or where a leaf touches. No feeding is done on the outside of the fruit, except to gnaw a minute entrance hole through the skin. More often the little worm squeezes itself through between two of the calyx-lobes and gets its first meals *in* the blossom end.

When I found that most of the worms did not hatch until about two weeks after the blossoms had fallen, I was at a loss to explain how a Paris green spray, applied according to the prescribed rule of "just after the blossoms fall," could possibly affect a worm appearing on the apple so long afterward. Fortunately I had watched the development of the young fruit, and had seen some interesting things taking place which apparently explain this mystery of how we kill the apple worm with a poison spray.

When the petals fall, the small, green calyx-lobes are widely spread out, forming an open saucer-like cavity in which the poison spray could easily be lodged. Within a week, however, these calyx-lobes begin to draw together, and, usually in two weeks after the petals fall, the lobes are drawn tightly together over the cup-shaped blossom-cavity; there is then no possible chance to get any poison into the blossom-end. Few, if any, of the worms hatch before the closing of the calyx-lobes takes place. But about eighty per cent of the young worms enter the young fruits through this calyx-cavity, and they also spend the first few days of their life in feeding in this cavity. Hence I was naturally led to theorize that the poison must lodge in the open calyx-cup, and remain there while Nature proceeds to draw a protecting roof over it. Fortunately, about the time the worms were hatching, I found some apples which had been sprayed with Paris green and

Bordeaux mixture just after the blossoms fell. I could discern with a lens minute bluish particles in the calyx-cups. About fifty of these calyx-cups were submitted to our chemist, and he soon demonstrated the presence of arsenic.

These facts lead me to believe that in applying a poisonous spray soon after the blossoms fall, we deposit some arsenic in the calyx-cavity, where Nature kindly takes care of it for us until ten days or two weeks later, when the little apple worm includes it in the menu of his first few meals. Furthermore, this poisoning of these young worms which enter the developing fruit in the spring seems to be the only way and the only time that the insect is or can be most successfully reached with the spray. Or, put in another way, we can hope to reach with a poison spray only those apple worms which enter the blossom-ends of the forming fruits in the spring. To do this, the application must be made soon after the blossoms fall, when the calyx is open. If we wait a few days, until the calyx-cavity is closed, it will be too late. I can conceive of no possible way in which a majority of the fifteen or twenty per cent of the worms which enter the fruit at some other point in the spring, and all the worms of the subsequent broods, can be effectively reached with a poison spray.

Thus, while the spraying method is very effective, it can never prove a perfect panacea, especially where there are two full broods or more of the insect in a season. However, it is a great improvement over the old banding method, for with the spray we kill the worms before they fairly begin their destructive work, thus saving the fruit they would otherwise ruin with an ugly worm-hole. If it were not for the habit of the worms of feeding in the blossom-end for a few days, it is doubtful whether spraying would be nearly so effective as it is. It is thus a remarkable fact how much of our success in fighting this pest depends upon this trifling habit of the little worms.

In short, to use the poison spray most effectively, one must understand that it is necessary to fill the blossom-end of each apple with poison within a week after the blossoms fall, for this is where the little apple worm gets its first few meals, and it is practically our only chance to kill it with a spray. Watch the developing fruit after the petals fall, and be sure to apply the poison before the calyx-lobes close, for while *the falling of the*

blossoms is the signal to begin spraying, the closing of the calyx-lobes a week or two later is the signal to stop spraying.

Another and familiar insect pest which has received considerable attention at the insectary of the Cornell Experiment Station is the Peach Borer. It is an American insect, and for more than a hundred years it has been recognized as a very serious obstacle to the growing of peaches in this country. Almost every one who has grown this luscious fruit is only too familiar with the telltale gummy mass found around the base of peach trees in which the grub-like caterpillar of this pest is at work.

The life-history and habits of the insect were fairly well known to the earlier writers. In the latitude of New York the borers begin to mature in the latter part of June, and, coming nearly to the surface of the ground, they spin about themselves a cocoon made of silk and particles of bark. The cocoon is usually at the entrance to their burrows. In this cocoon the caterpillar soon transforms to a brown pupa. Two or three weeks later this pupa pushes itself about half way out of its home, and, its skin splitting down its back, a beautiful wasp-like moth emerges. The female differs quite remarkably from the male. As they fly very swiftly during the hotter parts of the day, and frequent flowers, they thus increase their resemblance to wasps. In New York the moths begin to emerge about July 15, and most of them are out by August 1. The females soon begin to glue their small, brown, hard-shelled eggs on to the bark of the trunks of the trees. I have taken two hundred and forty-four eggs from a single female, and nearly six hundred have been found in one in New Jersey. These eggs hatch in from seven to ten days, and the caterpillars at once begin their destructive work under the bark at or below the surface of the ground. They continue to work until cold weather sets in, when they ensconce themselves in a loose, cocoon-like home near the surface of the soil, and there remain all winter without feeding. This winter habit of the borers seems to have been only recently observed. In New York the borers begin work in the spring about May 15, the time varying with the forwardness of the season. From this time on, they feed much and grow very fast. I have seen caterpillars, not over a quarter of an inch long on April 19, get their full growth and transform to the moth by July 20. Thus most of the damage is done in the spring, in May and June, when the

borer gets most of its growth. There is but one brood of borers each year, the one-fourth to one-third grown ones wintering over.

The insect is destructive only in the borer stage, and as it works beneath the surface of the ground it is difficult to get at with remedial measures. Fortunately, the peach tree heals over a wound quickly, and will thus endure and recover from the attacks of several borers or from wounds made by a knife in digging out the pest.

It is a remarkable fact that, although dozens of things have been recommended for preventing the ravages of this common pest, there is no record of any careful experiments against it. Furthermore, it will be found that when some fruit grower claims to have been successful in preventing the work of the borer by the application of a certain substance, he usually discredits the whole thing by incidentally mentioning that he regularly digs out the borers once a year. Why not give the credit to the "digging-out process" where it usually rightfully belongs?

During the past three years we have been experimenting with all of the methods we could find recommended, and have also tested what measures suggested themselves as the work progressed. Four hundred and fifty young peach trees were set rather close together especially for this experiment. Four rows of seven trees each were treated, each row with a different substance usually, and the next two rows left untreated for a check; and so on through the field, duplicating each application at some other portion of the orchard in order to give each as fair and complete a trial as possible. This extensive experiment was scientifically conducted with the utmost care, one year's work checking and furnishing ideas for the following year. All applications were made about the same time, usually during the latter part of June, and everything was done as thoroughly as possible. The following spring every tree, treated or untreated, would be carefully examined, and the number of borers removed from each noted. For three years most of the substances were tested in this thorough manner. A few old and badly infested trees near by always furnished a plentiful supply of the moths to restock our experimental orchard. Every year the four hundred and fifty trees would yield, on an average, at least one borer to each tree. As many as thirteen borers have been found in a single tree less than two inches in diameter.

Twenty-one different things were tried in this experiment, all of which were of a preventive nature except one, carbon bisulphide.

Carbon bisulphide is a very volatile, bad-smelling liquid, which is now being extensively used against the peach borer in one locality in California. Although some who have tried it admit having killed many of their trees, yet one of our correspondents writes that "they cannot get the liquid fast enough." We injected some of the liquid into the soil near several of the trees in our experiment, but we failed to kill any of the borers. It is thus very doubtful whether it will ever help us here in the East in combating the peach borer.

We found the following substances entirely ineffective in preventing the work of the borer; all were washes except one, a mechanical protector of wire gauze:

Assafœtida and Aloes.

Lime, Salt, and Sulphur Wash (extensively used in California for scale insects).

Resin Wash, two applications.

Strong Solution of Hard Soap.

Hard Soap, Carbolic Acid, and Lime (*Hale's Wash*), two applications.

Tallow. — This formed a thick, complete, and very greasy coating lasting until the next year. I cannot understand why it was not more effective. But certainly as many, and one year even more, borers got into those trees treated with tallow than into untreated trees.

Tansy, grown around the base of trees.

Whale Oil Soap, two applications.

Whitewash.

Paint made with Lime and Linseed Oil.

Wire Gauze Protector. — A mosquito wire netting placed around the base of the tree, at a distance of about an inch or more from the bark, and the top edge slit down and then drawn together tightly around the tree and tied, thus making a perfect cage around the tree, extending to the roots and for a distance of about a foot above ground. Theoretically it was a perfect mechanical protector. But in practice more borers were found in trees thus protected than on untreated trees

near by; it was from one of these protected trees that I took thirteen borers. Why the insect preferred these caged trees I cannot explain.

Six of the substances tried proved partially effective; two of these might be termed mechanical:

The old "Mounding System," practised extensively many years ago, apparently kept out about half of the borers.

Tarred Roofing Paper, carefully and tightly wound around the base and extending below the ground to the roots, seemed to protect the trees from all but about one-third of the borers. This proved next to the best preventive tested, but required much care in applying it to accomplish the required result.

White Paint (White Lead and Linseed Oil) apparently kept out from one-half to two-thirds of the insects.

White Paint and Paris Green seemed equally as effective as the white paint, but it injured the bark of the trees so much that some of them eventually died. It may not injure older trees.

Coal Tar, warmed up a little and brushed on, formed a "wash" which proved the most effective thing we tested. Only a very few borers succeeded in getting started in these trees. Coal tar has been reported as injuring or even killing peach trees, but none of our young trees seemed to show the slightest injury, even after fresh applications of the tar had been made on the same trees for three years in succession.

While, as above noted, white paint and Paris green injured the trees more or less, the following substances proved sure death to the trees:

Paris Green mixed with Glue. — This "wash" killed our young trees in about two weeks.

Raupenleim, or German Caterpillar Lime, a substance resembling axle-grease, when applied the first year did not kill the trees and it kept out the borers. But the second year every tree to which it was applied was killed.

Dendrolene, an American imitation of the Raupenleim, which has been extensively recommended and advertised, proved sure death to the trees the first season.

Thus, after three years of careful tests of all the substances which gave promise of being effective, nothing was found that would keep all the borers out and not at the same time injure the tree. Most of the "washes" recommended proved entirely useless, and others only partially effective. To be effective, a wash must have the quality of forming a good, continuous coating over the bark from the first of July until the middle of September; and it must not contain anything that will injure the tree. A wash which has to be applied more than once a year will not pay, for one can dig out the borers quicker. All the washes containing lime usually cracked and peeled off in a week or two, thus necessitating a renewal. To apply properly a wash or a mechanical preventive, one must dig the earth away down to the roots, brush the bark off clean, make the application thoroughly, and then replace the soil. It requires little, if any, more time or labor to dig out the borers than it does to make one thorough application of a wash, or to adjust the tarred paper or wire gauze protector. It is doubtful whether anything will ever be found which will not require renewal every year.

In short, a three years' careful test of all the promising methods for preventing the ravages of the peach borer has convinced us that one can dig out the borers with about as little expenditure of time and money as it will take to apply washes or mechanical contrivances thoroughly enough to keep the borers out. The "digging-out" process is certainly the surest one yet devised.

When shall we dig them out? The borers are most easily discovered in June when they are larger and their work is more conspicuous; hence one is sure to get more of the borers by digging them out at this time. Early in the spring or in the fall the borers are so small that many are often missed. As noted above in telling the life-story of the insect, the one-third or one-half grown caterpillars winter in a thin, cocoon-like home near the surface. During the winter of 1896–97 a warm spell occurred which thawed out the ground to a depth of a few inches. Several wide-awake fruit growers discovered that by simply hoeing away the gummy mass and scraping the bark a little they could remove to a safe distance many of the little borers in their winter homes.

We began this peach-borer experiment confident that some sure preventive against its entrance into the trees would be found, and

there was nothing lacking on our part to have the substances do all that they were recommended to do. Although we did not accomplish our ideal, the experiment did demonstrate what is often equally as valuable and important to know; that is, *to know what not to do.*

DISCUSSION.

J. W. Manning said that he had never found any better remedy than digging out the peach borers; he thought one could not examine the trees too often.

Joseph H. Woodford recalled the statement in regard to washing trees, and asked whether coal tar, if effective, is the most effectual preventive, and whether it kills the trees or not.

Professor Slingerland answered that they expected that it would kill the trees, but after an application on young trees for three successive years it was found that it did not. It kept out nearly all of the borers. Washes are more apt to kill trees if put on before they are established; he would wait until the trees are well started before applying.

Dr. Newhall asked whether spraying while the tree is in blossom did any injury.

Professor Slingerland replied that it did; it not only wets the pollen, but repels insects; they will not visit a wet flower. There is no doubt that you can kill bees by spraying at that time; they not only die themselves, but they take the poison home and their young are killed. The bee-keepers have tried to procure the enactment of a law forbidding spraying when the trees are in blossom. It is, however, done by men who make a contract to spray trees, and they often do it when the trees are in blossom.

Samuel Hartwell asked whether there had ever been more than one worm found in a single fruit.

Professor Slingerland had found five egg-shells on one apple, but found no worm in the apple. He said that four or five apples have been found with more than one worm, but the worms were of different ages.

Rev. Calvin Terry had found coal ashes effectual around peach trees, and thought that there was something in them that is offensive to the borers.

Professor Slingerland said that was really similar to the old mound system, with perhaps something gained from the ashes.

A. W. Cheever asked about the apple maggot.

Professor Slingerland said that it had been very thoroughly studied; it is getting southward and it is a very serious problem. It cannot be harmed with a spray. Hogs might be used to pick the apples up, or the apples could be picked to prevent its spread. Here it is called the "railroad worm."

Mr. Manning said that it has been here for fifty years.

Thomas Harrison inquired whether apple and peach borers are the same.

Professor Slingerland answered that they are very distinct. The peach-tree borer works under the bark, while the apple-tree borer works in the heart of the tree. One is a moth and the other a beetle.

BUSINESS MEETING.

SATURDAY, February 19, 1898.

A special meeting of the Massachusetts Horticultural Society was holden at half-past twelve o'clock today in accordance with the following request:

BOSTON, Mass., February 14, 1898.

HON. FRANCIS H. APPLETON, *President of the Massachusetts Horticultural Society, Boston, Mass.:*

DEAR SIR: The undersigned, members of the Society, respectfully petition that a meeting be called at as early a date as is practicable, to consider and determine what action the Society will take in the matters of acquiring land for a new building, of erecting a building thereon, of providing funds for such land and building, of disposing of the land and building now owned by the Society, and of managing and disposing of any real estate which the Society has acquired, or may acquire, from the estate of the late Francis B. Hayes; and to transact such other business as may legally come before the meeting.

WILLIAM C. STRONG,	CHARLES E. RICHARDSON,
CHARLES H. B. BRECK,	HENRY S. ADAMS,
CHARLES H. BRECK,	GEORGE F. PEIRCE,
JOS. H. WOODFORD,	ARCHIBALD SMITH,
ROBERT MANNING,	JAMES H. BOWDITCH,
MARY C. HEWETT,	CHARLES W. PARKER.

In compliance with this request, agreeably to Section XII of the Constitution and By-Laws, the following notice was sent to every member of the Society:

MASSACHUSETTS HORTICULTURAL SOCIETY.

BOSTON, February 14, 1898.

Pursuant to the provisions of the Constitution and By-Laws, at the request of twelve members of the Society, the President hereby calls a special meeting of the Society, to be held at Horticultural Hall, 101 Tremont street, Boston, on Saturday, the nineteenth day of February, 1898, at half-past twelve o'clock in the afternoon, to consider and determine what action the Society will take in the matters of acquiring land for a new building, of erecting a building thereon, of providing funds for such land and building, of disposing of the land and building now owned by the Society, and of managing and disposing of any real estate which the Society has acquired, or may acquire, from the estate of the late Francis B. Hayes; and to transact such other business as may legally come before the meeting.

FRANCIS H. APPLETON,
President Massachusetts Horticultural Society.

ROBERT MANNING,
Secretary.

At this meeting the President was in the chair. The call for the meeting was read by the Secretary.

Joseph B. Warner, Esq., counsel for the Society, was introduced by the President, and read the following vote:

Voted, That the Finance Committee, as now or hereafter constituted, is hereby authorized to sell, mortgage, lease, or otherwise dispose of the whole or any part of any property which has been, or hereafter may be, conveyed to this Society by the Trustees under an Indenture of Trust made by Francis B. Hayes and dated June 12, 1889, or be in any way acquired by the Society under said Indenture of Trust, or under the will of said Hayes; and is further authorized, for and in behalf of this Society and in its name or otherwise, and with or without its corporate seal, to make, execute, acknowledge, and deliver, or authorize to be made, executed, acknowledged, and delivered, all deeds, contracts,

or obligations which may be necessary or convenient in effecting such sale, lease, mortgage, or other disposition, including obligations for the repayment of any money borrowed on such mortgage.

The above vote was unanimously carried in the affirmative.

The President then read the following vote:

Voted, That it is expedient for this Society to move from its present building to a new one to be built for its use, and that it is desirable to procure land in the city of Boston for such new building, provided it can be obtained at a satisfactory price.

On motion of O. B. Hadwen, it was voted that when the vote should be taken it be by ballot, and that each member write his name on his ballot.

On motion of J. D. W. French, it was voted that the members be restricted to five-minute speeches.

After a full discussion of the subject the President requested J. D. W. French, James H. Bowditch, Benjamin C. Clark, and William C. Strong to collect and count the ballots.

The President reported the whole number of ballots to be 170, viz.:

Yes	65
No	105

and the vote was defeated.

The meeting was then dissolved.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 19, 1898.

A meeting for Lecture and Discussion was holden at eleven o'clock today, Vice-President Benjamin P. Ware presiding.

The following lecture was delivered:

RAMBLING NOTES ON TREES IN THE STREETS AND ELSEWHERE.

By WILLIAM R. SMITH, Superintendent of the Botanic Garden, Washington, D.C.

"Jock, when ye hae naething else to do, ye may be aye sticking in a tree; it will be growing, Jock, when ye're sleeping," is the advice which Sir Walter Scott put into the mouth of

the dying Laird of Dumbiedikes to his son, and which was actually delivered in these very words by a Highland laird when on his death-bed, to his son. This guid advisement might be followed in most of our States and Territories with the most beneficial results.

"Trees are indeed the glory, the beauty, and the delight of nature. The man who loves not trees, to look at them, to lie under them, to climb up them (once more a schoolboy), would make no bones of murdering Mrs. Jeffs."

"Every man of landed property, that lies fairly out of arm's length of a town, whether free or copyhold, be its rental above or below forty shillings a year, should be a planter. Even an old bachelor, who has no right to become the father of a child, is not only free, but in duty bound to plant a tree. Unless his organ of philoprogenitiveness be small indeed, as he looks at the young, tender plants in his own nursery-garden, his heart will yearn toward them with all the longing and instinctive fondness of a father. As he beholds them putting forth the tender buds of hope he will be careful to preserve them from all blight, he will 'teach the young idea how to shoot,' and, according to their different natures, he will send them to different places to complete their education, according as they are ultimately intended for the church, the bar, or the navy. The old gentleman will be surprised to see how soon his young plants have grown as tall as himself, even though he should be an extraordinary member of the Six Feet Club. An oak sapling, of some five or six springs, shall measure with him on his stocking-soles, and a larch, considerably younger, laugh to shake its pink cones far over his wig. But they are all dutiful children, never go stravaiging from home after youthful follies, and standing together in beautiful bands, and in majestic masses, they will not suffer the noonday sun to smite their father's head, nor the winds of heaven to 'visit his face too roughly.'"

These extracts are from the "Rhapsody" of Christopher North, in "Blackwood's Magazine," April, 1828. This essay was first brought to my notice by a distinguished son of the Commonwealth of Massachusetts, an idealistic lover of trees, Hon. Charles Sumner. His eloquent appeal in the United States Senate to the improvers of the Capitol grounds to spare the splendid specimen of *Carpinus Betulus* growing about a stone's

throw from the Senate chamber is memorable. Alas! his warning was in vain, for the tree is now dead. Its successor, planted by his friend John A. Bingham twenty-five years ago in the Botanic Garden, is a rather handsome specimen. Voltaire was a great lover of this tree. If when you visited his home at Ferney you did not admire the hornbeam hedges and trees you were not invited back. It is much used for hedges and wind-breaks in France and Germany.

I am very much in favor of memorial tree planting in public parks. In the Botanic Garden at Washington we have fifty trees thus made more interesting. Senator Hoar's fine plant of *Cedrus Libani* is of interest to Massachusetts people, and its companion, planted by Senator Evarts, is doing nearly as well.

As to whether the Archbishop of Damascus is correct or not in his assumption that Solomon planted this species with his own hands in the quincunx manner, as they now stand in the valley of Mount Lebanon, we will not venture an opinion. Lamartine, who visited these trees in 1832, very properly says, "They are the most renowned natural monuments in the universe." Religion, poetry, and history have all equally celebrated them. In Washington they have flourished forty years without injury. At Claremont and Sion House, in the neighborhood of London, there are Cedars of Lebanon over one hundred years old, and eighty feet in height. At Hopton House, near Edinburgh, and at Beaufort Castle, in the highlands of Scotland, there are trees over one hundred years old. At the latter place it is said the tree rises with all that boldness of outline and permanence of aspect which render it the glory of Lebanon and the boast of Palestine. It is to be hoped that this tree will be more planted in the future. It is especially adapted to cemeteries.

We saw, when last in Edinburgh, one hundred thousand young trees of this kind in the nurseries there. Will my enthusiastic friend Mr. Jackson Dawson inform us what he saw of *Cedrus Libani* and its varieties when there last year?

As to trees in the streets, there are two sides to the subject. There is no doubt that trees are an absolute necessity in the wide asphalt, or other paved streets in the city of Washington. But even there business streets as a rule are not treed. After the powers that be, in cities, towns, or villages, have carefully considered whether or not trees are desirable, and it has been

decided in the affirmative, we should like to make a few suggestions — not directions — gathered from an experience of over twenty years, as Chairman of the Tree Parking Commission in Washington, where we have planted over seventy thousand trees in the streets, avenues, and parkings. As failures in this matter are not only expensive, but disappointing, we would recommend that you secure the best talent available. If experience is limited see that your advisers have that with which the great painter Opie mixed his colors. "With brains, sir," was his gruff reply to the dilettante who asked him how he did it.

In Washington, where the soil is generally poor, we usually remove two or three good sized cart loads from a hole and replace with the best top soil to be had. We do this in dry weather for obvious reasons: we stir up the bottom and avoid compacting the sides of the hole. Do not plant too close. The character of the tree selected must determine the distance apart.

I hold myself chiefly responsible for a great mistake in Washington, which was corrected by my kind friend Major Twining, engineer in charge of public works in the District of Columbia, with the remark: "Smith, you have planted your trees too close, or not close enough, so as to admit the cutting out of every other one." This matter was better regulated afterward.

One important aid to success is the tree box. It is doubtful whether shading the stem of the tree from the sun, to prevent scalding, or holding the newly-planted tree steady, is its most valuable service. The straps should be carefully arranged and properly fastened. Four chestnut stakes, five feet and a half in length, are driven into the ground and well nailed to the box. A photograph of the trees and boxes, together with a map of the city, for which I am indebted to Mr. John W. Langdale, an employee of the Parking Commission, who is responsible for its accuracy in detail (and I indorse it), located the sixty-four kinds of trees in the streets, avenues, and parking in the city of Washington. The little parks and most of the reservations are under another management. This map and photographs will be left for consultation in an institution you should be thankful for and proud of — your great Horticultural Library.

Do not attempt to go into the woods or uncultivated ground for trees, except as a dire necessity. We were compelled to do this at first, for some things, and were moderately successful

with American sycamores, elms, scarlet maples, and tulip trees. They were not to be had in the nurseries at the time. By transferring them to cultivated ground in the nursery established by authority of Governor Shepard, and cutting them severely back, educating them for their duty in life, we got moderately good results; but it is my deliberate opinion that in the interest of economy it is better to get nursery-grown young trees. Every city or village or suburban town ambitious for distinction as to being well treed should have a nursery of its own, where healthy trees can be reared. Get clean seedlings from some reliable source; cultivate, prune, and train them in the way they should grow, in the best ground attainable. This last suggestion is of great importance. Trees from a poor, thin, gravelly soil, or from a wet, sour, undrained one, are worthless.

That queen of American trees, the sugar maple, is useless from such a source. This lovely tree, when barkbound from any cause, should be dispensed with, and a young healthy one substituted. It refuses to do duty as a curbstone tree in Washington. Like an Arab steed hitched to a dray, when planted with pavement to the right of it, pavement to the left of it, and a curbstone barricade in front of it, it rebels. How can it, under such circumstances, develop that beauty for which it is so famous? Vermont avenue and H street, west of the War Department, were planted with this tree, but it is anything but a success. A beautiful avenue of sixty sugar maples, brought as small trees from the mountains of Kentucky and planted from the mansion to the spring of Francis P. Blair, General Jackson's great friend and my earliest friend in Washington (his place being known as Silver Spring), flourished grandly for twenty-five or thirty years. Then all at once they lost heart and died; just why I am unable to say. A Norway maple I planted as substitute for one killed by accident still thrives. There are some good specimens in the Smithsonian grounds, not far from the monument to Mr. Downing, in well-drained naturally good ground, planted there under his direction.

The two we planted in the filled-up ground in the Botanic Garden also lost heart and died; while a black-sugar adjoining them is one of the handsomest trees in the garden. They were planted thirty years ago. The Norway maple is one of the best curbstone trees, less self-asserting than some others, but selected

for Sixteenth street, which leads from the President's mansion to the north District line, a distance of six miles. This avenue is one hundred and sixty feet wide, and two miles of it is finished. For the parking, it was my privilege to present the beautiful Liriodendron or Tulip trees, with which it is planted, to the city. This street is, we believe, to be called Executive avenue. If the trees are well cared for it will make the handsomest avenue in Washington. The tulip tree is not, in my opinion, a good curb-stone tree.

But permit me to introduce one which I think is among the best as a curb tree, *Salisburia adiantifolia*, the Ginkgo of the Japanese, or Maiden Hair tree of the botanists. Two of these interesting trees have flourished in Washington for sixty years or more, apart, however, and being unisexual no seed was produced. We were two years rooting a hardwood cutting and have a good tree thus propagated. Mr. Jardine, a Frenchman, an importer of trees and shrubs, sold to the British Legation two ginkgos to plant one each side of the *porte cochère*. He charged seven dollars and fifty cents apiece for them. The bill was disputed, and we were made referee. The matter was compromised at five dollars each. Shortly after, when searching for street trees, I visited Hoopes Brothers & Thomas, West Chester, Pa. Walking through the nursery with my friend Josiah Hoopes, we came to a large block of ginkgos. "There," he says, "you know that's a good thing, but our agents won't touch it. It won't sell." "What will you take for it?" I asked. "I'll take forty cents apiece just to get rid of it," was his reply. We bargained for three hundred. Pierce street is now planted with them; also another short street, Seventeenth and a half, just west of Lafayette square, where they are not so fine as on Pierce street, owing to their being robbed by adjoining elms in the square, and the soil being not so good. On Pierce street may be seen the effects of planting too close; nevertheless, they are very fine, and fruit freely. I have never seen an insect near them. This tree has a very interesting Boston history, which we find in Hooker's "Journal of Botany and Kew Garden Miscellany," Vol. 2, 1850, p. 318, under the heading, "The Ginkgo Tree on Boston Common." A ginkgo tree formerly stood in a garden belonging to Mr. Greene, which garden was in the centre of Boston. After his death (1832) the house and grounds were sold. This tree was

removed at the partial cost of the city (each of Mr. Greene's children paying a hundred dollars towards the expense) to the mall encircling the Common, and planted before the windows of Mrs. Greene's house, in which she resided after her husband's death. The tree is a native of China, and was of full size when Mr. Greene, Sr., purchased the garden in 1798. It is now in fine leaf and beauty. The accompanying lines by Dr. Bigelow appeared in the public papers some months after the tree's removal. This poem consists of fifteen stanzas. We quote the last:

> "And so thou hast survived thy fall,
> And fairly disappointed all
> Who thought to see thee down;
> And better days are stored for thee —
> Long shalt thou live, triumphant tree,
> And spread thy foliage broad and free,
> A credit to the town."

Is this individual tree still triumphant? If not, how long did it live? Mr. Downing, three years afterwards, wrote with approval of the operation of transplanting it. He gave its height as forty feet and its circumference as three feet. How is it now? A full history would be interesting.[1]

I have never been in favor of expending large sums of money for moving trees, even to satisfy public demand. I have looked in vain for permanent success in this matter. It usually takes a young healthy tree about the same time to grow up as it does a large one to die, after being removed. The experience of the Chicago people, years ago, with their high-priced, half-dead trees, is an example. Around the National Capitol, with great care and skill, under the direction of Mr. Olmsted, liberal sums were expended to lower and remove large trees of various kinds in considerable number. But none are left to tell the tale of their tribulations, with the exception of a few of the smaller ones, notably a European walnut, twenty feet high, twelve inches at the ground line; first raised in a pot from seed grown in Wash-

[1] The ginkgo tree above mentioned is now four and a half feet in circumference at five feet above the ground, which has apparently been filled in round it, as no part of the swell of the roots is visible. As nearly as can be judged by the eye it is about sixty feet high. The limbs still show where they were shortened when the tree was transplanted. The lower limbs have made little growth, which is doubtless partly due to other trees standing near, but near the top it has made strong, vigorous shoots. It stands in the inner row on the Beacon-street mall, opposite No. 33 Beacon street. — Ed.

ington and twice transplanted in the Botanic Garden, owing to the change of grade. It was removed to the south side of the Capitol, east, where it is a fine tree, bearing abundantly. Such valuable seeds, however, are usually secured by the small boy, much to my chagrin. I think hardier trees might be obtained by planting the seeds. It is to be regretted that the Middle States do not take this matter up. We should not send money abroad for walnuts. California does not, but freight from there is expensive. Some *Quercus macrocarpa* and *Q. palustris*, about the same size, were also moved. They have thoroughly recovered and are goodly trees.

Much more might be written on this subject, but it is enough if I get you to observe and think before spending money on transplanting large trees.

The Western Rock Elm, *Ulmus racemosa*, is a tree worthy of more attention than it has received. A dozen or more trees as curbstone trees, mixed with the other elms, are not attacked by an insect, as far as my observation goes. The two in the Botanic Garden, never. Professor Sargent, in "The Garden" (London, Aug. 10, 1878), writes of this tree as being valuable for making agricultural implements; its wood as being susceptible of a high polish, fitted for a hard finish; and its heating power nearly equal to that of hickory. It is a good street tree (nurserymen, make a note of this).

The Wahoo Elm, *Ulmus alata*, is another species not attacked by insects. The first living specimen Professor Gray ever saw was the tree I dug up in Richmond before the war. It is now a large tree, never injured by the weather. It is worthy of trial much farther north. There are fifty of these trees in the streets and parks of our city, too bitter, I think, for even hungry insects.

I have only to mention the majestic American Elm and say, "Give it room, it must have room." To say more in New England would be supererogation. Another remark we might make is that it bears the knife when young, but not the saw in after-time. Only dire necessity should be the excuse.

The Eastern Plane, *Platanus orientalis*, in Washington, is one of the best all-around street trees. The first planted in the District, as far as I can learn, was the one that we now call Thaddeus Stevens's Memorial Tree. At his suggestion two stalwart contrabands planted it in the Botanic Garden, on the

bank of the Tiber, the arching of which caused its removal to Lincoln square, where it stands a gem, occupying the centre, with its branches on the ground, shading its stem in a natural manner.

Frederick Law Olmsted, a man endeared to every lover of trees and landscape art, has used this tree with fine effect on the east side of the Peace Monument. We planted the occidental species on the west side of the same circle. Mr. Olmsted has also, after the manner of the ancient Romans, who were great admirers of this tree, planted the two western approaches to the Capitol with it. They are beginning to bear seed, and will soon be disseminated over the whole country, and thus the question where they will thrive will be tested. Evelyn's "Sylva" has some interesting stories about this tree.

Senators Hansbrough and Kyle are, with some success, trying them in the land of the Dakotas.

We have several streets planted with the Occidental Plane, *Platanus occidentalis.* They are greatly improved when severely trimmed; even the hollow-stemmed old specimens on Pennsylvania avenue, when so treated, were greatly renovated in appearance.

Another tree not troubled with insects is the Three-thorned Acacia, *Gleditschia triacanthos.* It bears pruning and is improved by it. We raise most of the trees from the variety *inermis*, but they come spiny, — not so many, however, as from the thorny type.

The Sweet Gum, *Liquidambar styraciflua*, Alexander Hamilton's American emblematic tree, is only a moderate success on the curbstone. Insects attack it. On the lawn it is better.

I have doubts about the genus Quercus as curbstone trees. As lawn trees, or in lines in the parking, they are grand. Pennsylvania avenue, east of the Capitol, is planted in the middle with *Quercus palustris.* They are doing well. It is to be regretted that it was not made uniform, as suggested by our dear departed friend Mr. Stiles, who saw, approved, and admired the two rows, half a mile long, of this oak, and said, "How grand it would be if continued to the Capitol!" See "Garden and Forest," 1894, for his notes on this subject. *Quercus rubra*, on Twelfth street, will be a grand double row in the near future, planted four feet from the curb in a continuous strip of parking.

Massachusetts avenue, four miles long, is planted with four rows of American Lindens, *Tilia Americana;* they are doing well.

It is not a perfect tree, but much better than the European Linden, which is apt to be destroyed by the borer.

The same may be said of the ash, especially the European species, *Fraxinus excelsa.* This is a very variable species, but none of the forms escape this terrible enemy. The American species he is not quite so successful in disfiguring and destroying. In the Botanic Garden there is a fine specimen of *Fraxinus Americana,* which has braved the storms of at least sixty winters or more. A cyclone broke it up about six years ago, necessitating its being headed back. It is now an ideal tree in summer; in winter not quite so idealistic. *Fraxinus pubescens* and *F. quadrangularis* are worthy of trial where there is good soil.

In a dainty little rare volume, with the author's autograph as a token of lifelong friendship to your humble servant, styled "The American Handbook of Ornamental Trees," by Thomas Meehan, Gardener, 1853, I find the following, under *Acer dasycarpum:* "One of the finest of our native trees. It is so often seen in a half-starved, stunted state, as a street tree, that one might be incredulous of its beauty, when under proper circumstances, from a mere description." One would think the talented editor and honored professor had recently visited the city of Washington. His description suits the actuality there at the present time. The clamor against tree trimming has nearly ruined the twenty-three thousand we have planted as curb trees in Washington. The limited supply of moisture and food obtainable in that position renders it necessary that this large growing tree should be judiciously pruned. It is not an idealistic theory, it is a condition that confronts us in this case. With roots caged and confined it is not possible for it to sustain a large top. Intelligence should take this whole situation into consideration and act accordingly. The habits and habitat of the trees should receive careful consideration.

Acer rubrum, the Red, or Swamp Maple. The latter name indicates the position for which it is best suited. Not being able to obtain this tree in the nurseries, we went to the woods, with but moderate success. Had we cut the small trees to the ground, when planting them in the nursery, I think we should have done better. Its gorgeous autumnal tints make it an object of great interest to every lover of trees.

Acer negundo, the Ash-Leaved Maple. This early herald of spring, with its beautiful green foliage and its rapid growth, would be an excellent street tree were it not for the bag-worm and web-caterpillar being so fond of it. In this respect it rivals the native cherries. If adopted, be vigilant to remove the bag-worms during the winter months, and watch carefully for the web-caterpillar in early summer. It should be skilfully pruned to keep it in good health.

Acer Pseudo-Platanus, or Sycamore Maple. With mountain tree we have had only moderate success. It gets covered with seeds, indicating its arrival at maturity, — a desirable condition in fruit orchards, but not in a street tree. (See Dr. Lindley's "Theory of Horticulture" on this subject.) There are many good specimens in Washington. A variety with the leaves a fine purple underneath comes true from seed, and is a striking object in the Capitol grounds when its leaves are moved by the wind.

Some fine specimens of *Acer campestre*, "the Turn-table Maple of the Romans," branching to the ground, forming handsome pyramids, planted there under the direction of Mr. Olmsted, have been tomahawked lately, agreeably to an uninstructed, semi-popular request.

Acer campestre Austriacum grows more freely, and is altogether a larger, different appearing tree, and may, when more abundant, make a street tree. It has not the dwarf habit of the species.

Æsculus Hippocastanum, the Horse Chestnut. We achieved satisfactory results with this tree on both Thirteenth and De Salles streets, owing to the opportunity afforded by the heavy filling required there. In poor soil, with no chance to root deep, by the last of summer it is not beautiful to look upon.

Permit me here to name a few probationers for the office of street decoration, and as sanitary cooling agents: *Phellodendron Amurense;* this, I think, would fill both offices. *Zelkova crenata*, *Z. acuminata*, *Celtis occidentalis*, American nettle tree, and *C. crassifolia*, the hackberry. These we would call necessity trees. Birds get the fruit in hard weather, and for this reason we recommend them to be planted largely in parks and other public places.

Catalpa Kæmpferi, of Japan. Railroad ties have been cut from this tree grown on the farm of Hon. Edwin H. Funston,

Iola, Kan., from seed furnished him by us in 1885. It is of more upright habit than the American species, and is, I think, a probable street tree in some sections. It is much used in wood engraving in Japan.

Ostrya Virginica (American Hop Hornbeam or Lever-wood) would make a nice small, but rather slow-growing street tree. It could be trimmed to a pyramid of dainty, enduring proportions.

Kœlreuteria paniculata, a small tree, much used by Mr. Olmsted in the Capitol grounds, is beautiful in leaf and flower, and its seed pod is interesting. Its habit makes it a doubtful candidate for street decoration.

I make bold to recommend that much abused tree, *Ailanthus glandulosa*, for certain streets. I quote from memory, from Mr. Linch, Curator of the Oxford Botanic Gardens. He says in an English paper: "There are twenty thousand of these trees in the streets of Paris." The objection to its bad odor when in flower can be overcome by cutting it back every two or three years. You will then get a rich tropical foliage and a low tree. I doubt whether it can be cured of its bad habit of suckering. It might help the matter to raise them from seed. Ex-Mayor Wallach informed me that there was a law against planting them in the District of Columbia, so none were planted.

Cedrela Sinensis flourishes in the city of Washington, but, like its near relative, the Ailanthus, it has the habit of throwing up shoots from the roots. Its usefulness has yet to be determined.

Populus angulata, the Carolina Poplar. We purchased one plant from the most scientific nurseryman of his age in the United States, W. D. Brackenridge, and planted it with others on the towpath of the canal on Third street, now a part of the Botanic Garden, where the original tree still lives; it is thirty-five years old, and not an ornament, but of interest as being the parent of eighty thousand trees planted and disseminated as cuttings. The talented botanist of the Agricultural Department, Professor Coville, illustrated the closeness of his observations by informing me as a curious fact that the *Populus angulata* were all male trees, and that the Necklace Poplar, *P. monilifera*, — an inferior tree mixed with them, — were females. We explained the matter by informing him they were all propagated from two trees procured from Brackenridge. Another tree from the same source, *Populus Græca*, first found near a village called Athens,

in the State of Illinois, is a good tree for narrow streets. Unlike its kindred pyramidal species, the Lombardy and Bolleana, it is not attacked by the borer, as far as my observation goes. It and the two trees first named, unless carefully pruned, become top-heavy, keep dropping their leaves all summer, and soon become dangerous to life and property. I regret to say hundreds of trees are in this condition at the present time in the city of Washington. For various reasons their trimming has been neglected.

The family to which they belong, *Salicaceæ*, affect damp, swampy, ague-breeding places, and in various ways are candidates for the high honors of quinine, as a cure for intermittent fever. As a preventive, if the five hundred acres of swamp land with which the city of Washington is surrounded, south and east, were planted with poplars and willows, their sanitary value would be immense. And then the charcoal, for making gunpowder, from the willows, might be an economic item in the future. Again, the more they are filled upon the faster they grow. My kind friend, the late Mr. Peter Henderson, in "Harper's Monthly Magazine," July, 1888, has some judicious remarks on this subject. The list of trees in that article, and the list on the map of Capt. W. F. Rossell, is a list of trees existing — not those selected by the Commission.

Professor Sargent, in "Garden and Forest," Jan. 17, 1894, criticised the list of trees recommended by various individuals for planting in Brooklyn. I agree with the learned professor in his remarks in nearly every particular. Those seeking light on this subject should read that article. It is especially instructive as to the trees not to be used in street planting.

It may interest you to know that the Camphor tree, *Laurus camphora*, is being planted as a street tree in New Orleans. A tree in a four-inch pot presented to the beautiful niece of Mr. R. Maitre, the distinguished horticulturist of New Orleans, in 1883, is now thirty-five feet high and fifty-two inches in circumference at the butt. From this tree we have received a liberal supply of seed each year.

President Jefferson's favorite tree was the Willow Oak, his enthusiasm for which is graphically described by his biographer, R. S. Raynor. Unless well supplied with food grows slowly. A few are planted on the street in front of the Treasury building. We would recommend that groves of it be planted in the various

parks or public places throughout the country, by his admirers, each individual planting a tree; none to be allowed to plant one, however, who has not reached his high intellectual plane of love for trees. A magnificent specimen stands as a sentinel near the monument of that intellectual aristocrat and truly great and good man, Professor Henry. It is seventy feet high, and eleven feet in circumference six inches from the ground.

By cutting back severely, carefully watering when necessary, and cultivating with the assiduity which a good farmer uses towards his corn crop, we reached a phenomenal success in the early days of tree planting in Washington.

Do not let dudeism drive from your street trees the white-washer. If he uses lime, blue or other colored clay, sulphur, lampblack, salt, or other material, he will greatly improve your trees and add to the health of the neighborhood — perhaps killing the much dreaded microbes of diseases. Scale insects, fungi, and lichens it will destroy. But it will not stop horses from gnawing the bark; woven wire must be used for that. For bad boys who injure trees, and for gas leaks, it is difficult to suggest remedies. I can only say mend the latter and try to improve the former.

Arbor Day and Memorial Tree Planting should go hand in hand, creating a sentiment of love and veneration for trees.

Gentlemen: After I had accepted the kind invitation of your excellent Committee to appear before you I was astonished at my self-assurance in undertaking to address the most ancient, most successful, most honored horticultural society on the continent of North America. My tribulations are now over. I thank you for the privilege and for your kind attention.

Discussion.

Dr. Goodell thought that one very important matter not alluded to is what to do with the electric enemy.

Mr. Smith said he is so angry about it that he did not care to mention it. It is very destructive, and often kills trees.

O. B. Hadwen did not want to walk behind any one in the love for trees; he grows more as he grows older, and has in his grounds most of the trees spoken of by the lecturer. He said that he has a tulip tree which is eighty feet high, elms that are nine feet in circumference, and some black walnut furniture

made from trees which he had himself planted. His love is not only for conifers, but for deciduous trees as well. He asked whether the Ginkgo of Japan and the Ginkgo of China are the same. He thought that trees here in New England want high feeding.

Mr. Smith said that the Ginkgo of China and Japan are the same.

Thomas Harrison questioned what should be done with electric corporations. He thought that they should be obliged to put an insulator on trees to which wires are attached. As it is now, as soon as the covering to the wire is worn off by rubbing against the tree, the tree is set on fire.

Rev. C. S. Harrison believed in Arbor Day, and was interested in planting trees in treeless places. He spoke of one town which was planned so as to have the tall, quick-growing trees in the centre, and the slower-growing at the outside, with the view of forming a pyramid of green as seen from a distance. This was very well in the plan, but when carried out the people used the trees for hitching posts, and the horses ate off the bark, resulting in a loss of so many trees that the design was not successful. In the West, the Box-Elder, *Negundo aceroides*, has been discarded; it does not grow to any height, and is a harbor for many insects which come into the houses and deface the carpets, as they leave a red spot wherever crushed. He would advise the use of one tree only for a street.

Jacob W. Manning spoke of the value of *Celtis occidentalis*, the Nettle Tree or Hackberry, as a shade tree; it is perfectly hardy for the West and from Canada to Mexico. The largest tree he knows of is in West Springfield; it has a spread of seventy feet, and is six feet in diameter at the base. He said the Cottonwood, *Populus monilifera*, grows to a gigantic size, with a trunk from six to seven feet in diameter. There are great trees in the north — one near Downing's place at Newburg on the Hudson. He had noticed the Red Oak in Washington, and thought that fine effects have already been obtained with it.

Vice-President Ware noted that tree-planting had been suggested for bachelors. They can propagate trees.

Thomas C. Thurlow thought people often planted trees too thickly, and advised that great care should be taken not to plant too closely around houses, and especially on the street and

directly in front of the house. Sunshine is as necessary as shade, and it is as great a mistake to shut out all sunshine from our dwellings as it is to have no trees at all. He recommended people to procure competent advice before planting trees on our home grounds, or in the streets, etc., and thought we should use our native trees rather than send to foreign countries to get what are often not nearly as desirable.

Dr. Goodell asked how close to plant trees on streets. He suggested that not over one tree to a fifty-foot lot would be about right.

Mr. Smith said that these matters should be regulated by the law. He advised using one kind of tree to each street, and would avoid planting too thickly. Lindens should be planted about fifty feet apart, and elms at least sixty feet.

Mr. Manning thought that elms vary so much in size that they need various distances; some want more than one hundred feet. He suggested at least forty or fifty feet as necessary for street trees.

Mr. Smith said that in New Jersey avenue, in Washington, the trees are as large again in one place as in another. Everything should be considered and regulated by careful study. Plant wider apart in good soil than in poor.

Thomas Harrison inquired whether any fixed rules about pruning could be given.

Mr. Smith replied that the pruning required varies with each tree.

Mr. Hadwen noted that in Washington they had taken out two or three loads of poor material and replaced this with good soil. This, he said, is very important; the foliage and rate of growth are very different in good soil. The older he grows the more he doubts the value of putting trees in the sidewalk. He would plant them at least four or five feet within his own ground; they are then under his supervision.

G. L. Thorne, of Buffalo, N.Y., said that he had planted a good many trees — more than any of the Commissions in Buffalo have — and had found that common sense must be used. Some kinds do not grow well, so one must vary the distances, and also vary the distances with the condition of the land. Get a good tree, he said, to start with; here he has spent a good deal of money and finds that it pays. He suggested that two rows of

trees be planted where possible; then if something happens to one tree the other row will have one to take its place. Plant elms fifty feet apart. Soft maples planted in wet land, if well taken care of, are very satisfactory.

Daniel Sullivan said that if Paris and Washington had made good conditions for tree planting he did not see why we could not.

Mr. Manning replied that we could; but he had seen in Reading two trees planted, one at one end of the town in a gravelly region, where the gravel had been removed and replaced by good loam and the other in naturally good soil; the latter is now in the better condition, showing that, although preparation is made, the results will not be as good as where the soil is naturally good.

Jackson Dawson said that in order to get good trees you must have good holes; if you would have fine trees then first give the tree something to eat. He spoke of the remarks which have recently appeared in the papers about thinning out trees, and compared this work with the killing of trees by electricity, about which people say nothing. If we are going to plant trees we must have laws which will protect the trees. For street trees, he said, the Norway maple is good for short streets. The soft maple is too easily broken to be desirable. The liquidambar would probably be excellent. The tulip tree is brittle. The oaks are the coming trees for this climate. The black walnut is good, but sheds its leaves early. The chestnut is also good, particularly when in flower; it is, however, a dirty tree.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 26, 1898.

A meeting for Lecture and Discussion was holden at eleven o'clock today, the President, FRANCIS H. APPLETON, in the chair.

The following lecture was read by James Sturgis Pray, Secretary of the Columbine Association:

THE NATIONAL FLOWER MOVEMENT.

By FREDERICK LEROY SARGENT, President of the Columbine Association, Cambridge.

Mr. President and Ladies and Gentlemen:

During the fortunate years of peace that have thus far blessed the second century of our national independence, we have seen

develop throughout the United States a popular movement which is surely unique in the history of the world. This is the movement to bring about the adoption of a national flower. Here is a matter of pure sentiment seeking legislative recognition; a question of taste, if you will, leading to widespread organized efforts, to the formation of national societies, and to the calling of a national convention. Among the many interesting manifestations of American feeling which have characterized the close of the nineteenth century surely this unprecedented outcome is not the least worthy of our attention.

The desire for a national flower — now so widely felt among the best people of our country — springs mainly from two sentiments which all of us would cherish. These are the love of our native flowers and the love of our native land. To confirm the feeling that these sentiments are closely akin we need hardly be reminded that the floral emblems of other nations have played an important part in their history. For us a fitting national flower would bring to the service of patriotism an emblem whereby our love for the fatherland would find expression through one of its fairest products. If our people shall ever come to enjoy the benefits of such an emblem surely every true American must rejoice.

It cannot be claimed that the efforts which have been made to this end have always been wise. In fact, as we shall see, they have often been of the sort which adds to the griefs of the judicious. Nevertheless we cannot fail to find much that is helpful to the general movement in every earnest effort to be of service in this matter, and the helpfulness will be quite apart from the apparent achievement. However mistaken or ill-directed we may choose to consider the efforts which are opposed to our own, we may be sure they have all something to teach us and not a little for us to admire.

So far as I have been able to learn, the first candidate to be publicly suggested for our floral emblem was the mayflower, or trailing arbutus (*Epigæa repens*). The idea, I believe, came originally from a lady in Pennsylvania, Miss Margaret B. Harvey, who made it the theme of a poem, which she wrote while living near the site of General Washington's camp at Valley Forge. This poem was entitled "The National Flower, or Valley Forge Arbutus," and was published in March, 1887. Other poems inspired

by the charming qualities of this modest little flower have appeared from time to time.

The principal reasons which have been advanced for adopting it as our national floral emblem are these: It was one of the first blossoms seen by the Pilgrims at Plymouth after landing from the "Mayflower," and by Washington's army after their winter at Valley Forge. Its flowers suggest five-pointed stars, and its leaves are laurel-like. It grows wild in the thirteen original States, and displays an independence of spirit by defying cultivation.

Unfortunately, these alleged qualifications depend, for the most part, upon features that should entirely disqualify any candidate. Thus, its early blooming, which with us makes it a flower of April rather than of May, renders the blossoms unavailable for decoration on any national holiday — that is to say, when we should most wish to use them. Moreover, not only is the plant unknown in the wild state over three-quarters of our territory, but to those of our fellow Americans who dwell in that vast region it must remain unknown even in cultivation.

These facts are perhaps sufficient to show that the trailing arbutus is quite undesirable for our national flower, no matter what historical associations it may possess. But these very associations are most unfortunate. For this flower has been recognized for several generations as the floral emblem of Nova Scotia. As such it has appeared on coins and postage stamps of that province; it has been used in important ways in their historical celebrations; and on certain flags widely used by the Nova Scotians it occurs as a device accompanied by the motto, "We bloom amid the snows." The Nova Scotians are certainly to be congratulated upon having a floral emblem so admirably fitted for their purposes. With regard to those Americans who have wished us to take this emblem for our own it is but charitable to suppose that they have done so largely in ignorance of Nova Scotia's claim. We know that many who at first wished us to have the mayflower have now abandoned the idea. As to those who still cling to it, let us hope that their ideal of patriotism and national honor is not, as it would seem to be, disregardful of the commandment, "Thou shalt not steal," or of that which says, "Thou shalt not covet . . . anything that is thy neighbor's."

In many ways a more happy suggestion was that of the goldenrod (Solidago). I am informed by Miss Harvey that this idea

was published first in the Boston "Globe," in May, 1888. The fact that golden-rod grows wild in such profusion almost everywhere in the United States, and is such a brilliant adornment of the roadside, made it at once a very popular candidate. Its generous wealth and aspiring air of freedom soon found appropriate expression in verse. To some the composite nature of its ample clusters exemplified our motto, "*E pluribus unum.*" To others the golden color of the blossom seemed a fitting symbol of the gold standard which they upheld during our recent presidential campaign.

In 1889 a booklet, containing chromolithographs of the golden-rod and the mayflower, was issued by Messrs. L. Prang & Co., with a view to testing public opinion on the national flower question. Copies of the booklet were sent to a number of prominent persons, with the request that they tell what flower they would prefer for the floral emblem of the nation. Of the replies received, a large majority were in favor of the golden-rod. Not long after, a canvass of votes among school children, chiefly in New York State, showed a similar preference for the same flower. It was doubtless because of the enthusiasm then shown that the New York "Recorder" in 1895 issued a colored picture of a bunch of golden-rod, tied with a red, white, and blue ribbon, and labelled "The National Favorite."

For a while it looked as if all this enthusiasm would carry the day for the golden-rod. But a growing dissatisfaction was yet to be reckoned with — a dissatisfaction which continually increased among those who first welcomed the golden-rod as a candidate.

Such a revulsion was sure to come as soon as the golden-rod advocates attempted to use their flower for decorative or other purposes. They could not decorate with it on Memorial Day or on the Fourth of July, because it does not reach its prime until August or September. Even when it was in bloom they found it unsuited for indoor use. Its color, upon which they so much depended, was found to be dingy and unattractive when away from the strong light of the sun.

Its use indoors, moreover, met with vigorous protest in the interest of health, for physicians maintain that the emanations of this plant frequently produce asthma and are an exciting cause of hay fever or autumnal catarrh. Farmers either despise it as the "yaller weed," or hate it because of its dark record of injury to cattle, while, according to a recent announcement, the State Veter-

inarian of Wisconsin considers it to be the cause of a disease resembling consumption which has been killing thousands of horses.

The efforts to use representations of the golden-rod for decorative purposes have been scarcely more successful than the attempts to use the flower itself. When it has been impossible for the artist to indicate the color (as must often be the case in decorative design) he has felt it necessary to add a label conveying the information, "This is a golden-rod."

While practical considerations turned many people against the idea of making the golden-rod a national emblem, many others, with whom sentiment was paramount, soon came to see that arrogant aggression, cheap display, the false liberty which is unmindful of the rights of others, were characteristics which would make this plant a deplorable symbol for the American people.

As the Columbian celebrations approached the desire for a national flower grew apace and stimulated the efforts of many people in various parts of the country to bring about the adoption of some fitting floral representative. The most noteworthy of these attempts were in connection with the pansy (*Viola tricolor*) and the Indian corn (*Zea Mays*).

In comparison with the golden-rod the pansy, as will be seen, has the decided advantages of variety of color and simplicity and distinctiveness of form, combined with entire harmlessness. But on the other hand it lacks the necessary qualification of being a native flower, and is entirely without associations that would connect it with our country rather than with any other.

The suggestion of this flower, and the organization of the Pansy Society of America, is to be attributed, I believe, to Mr. Albert C. Hopkins, of Nashua, Ia. What has been published regarding the society would indicate that its efforts were chiefly among children in schools. At this distance from the scene of its activities it is difficult to form any just idea of the extent of its influence. It must be said, however, that its power, in 1892, was sufficient to induce the Hon. Walt H. Butler, Representative from Iowa, to introduce into Congress two bills embodying the views of the society. The first of these provides, in Section I, "That on and after the first day of May, A.D. 1893, the official and recognized floral emblem of the United States of America shall be the flower commonly known as the pansy; named also garden violet, hearts-ease, and so forth." Section II requires, "That the

national sentiment expressed in connection with this emblem shall be justice, liberty, union, culture, and peace; and that the last three words — union, culture, and peace — shall constitute the motto;" and Section III, "That the inauguration of this emblem shall be duly and fittingly celebrated on the first day of May, A.D. 1893, in connection with the opening of the World's Columbian Exposition." The other bill is intended "to make more definite, uniform, and symbolic the flag of the United States." The main provisions of this bill are first, that the union or blue field of the flag "shall hold the outline of a white pansy with a true pansy centre, which shall represent the capitol or central government; that the white stars, representing the States, shall be set inside the white outline of the pansy in a manner to produce the general effect at a distance of a white pansy in a blue sky." The second and last section provides, "that the staff of the flag shall be made to represent a sleeping American rattlesnake, head downward, with an acorn in place of the head, and a white pansy bud in place of rattles, the whole symbolizing defence, courage, wisdom, strength, peace, and immortality."

Lest you should think me taking liberties with your credulity, let me hasten to assure you that I am quoting verbatim the essential features of these bills. Imagine for a moment an acorn-headed pansy-tailed rattlesnake stiffened into a flagstaff, and bearing aloft as the banner of our country this travesty of the stars and stripes, proclaiming to the world an alien flower as Columbia's emblem! Surely when this extraordinary combination was conceived western wit was wool gathering. It is perhaps needless to say that this attempt to manufacture sentiment by act of Congress did not meet with popular approval.

In the advocacy of Indian Corn a hearty American feeling expressed itself in terms of genuine culture. One of the first notes to be sounded in its praise was a stirring poem by Edna Dean Proctor, entitled "Columbia's Emblem," which appeared in the "Century Magazine" for September, 1892. In 1893 the June number of the "Arena" had a symposium of eminent persons on "Maize as the National Flower," and in the same year appeared a little volume of "Tributes in Verse and Prose," entitled "Columbia's Emblem, Indian Corn." This collection included, besides the poem already mentioned, other poetic selections appreciative of the worth and beauty of maize, extracts from American

historians showing its importance in our national development, accounts of its ceremonial use by the red men, and illustrations of attempts to use it in architectural ornament.

Since the Columbian year the fortunes of this candidate for the national flower have sadly declined. While the advocates of maize had said many interesting things about their favorite, and in a most charming way, these proved to be very little to the point. The cordial words of welcome which at first greeted their suggestion in so many quarters were soon followed by words of vigorous protest backed by fundamental objections. To these no satisfactory answer has been forthcoming, and the significant chill of silence which has followed so quickly upon the first glow of enthusiasm has been made scarcely less depressing by the occasional confessions of some more or less distinguished persons that the objections aforesaid have had no weight with them. To the credit of others, among whom are included some of the most prominent of the original advocates of maize, be it said that they have recently expressed themselves as having entirely abandoned the idea of trying to make this plant our national flower.

How shall we explain the fact that a candidate which was introduced to the public under such favorable auspices, and vouched for by such distinguished leaders of public opinion, should prove so disappointing? My answer is that those who fondly expected the public to accept Indian corn as a national flower simply reckoned without their host. In the first place, we of the people are so constituted that not even with the imaginative help of the poet can we recognize in a maize plant what we mean by a flower. Though horticulturists have developed some ornamental varieties of maize, they class them as foliage plants and not as garden flowers. If a botanist insists that it has what he calls flowers we have to remind him that in this case, then, what he calls flowers are wrapped in husks. For the purpose of decoration there might as well be no flowers at all. To us it neither has what looks like a flower nor could we without making ridiculous pretence ever manage to use the plant as a floral emblem. In the second place, it has come to our knowledge that maize is not really a native of our country.[1] While we admire many foreign plants, and are glad

[1] All recent authorities agree that maize is not indigenous outside of Central and South America. See Gray's "Field, Forest, and Garden Botany," revised by L. H. Bailey, 1895, p. 468; Harshberger, J. W., "Maize," Contr. Bot. Lab. Univ. Penn., 1893, I, 2, p. 151; DeCandolle, A., "Origin of Cultivated Plants," p. 387 *et seq.*

to profit by them in various ways, we reserve a special affection for the plants belonging peculiarly to our native land, and this affection we wish to bestow upon our floral emblem. We insist that our national flower shall belong to our national flora. A national flower which is not a flower and is not national is not the sort of a national flower that the people desire. Moreover, the adoption of this plant would not only deny us what we seek, but would force upon our minds associations antagonistic to the feelings which a national emblem is meant to inspire. This would result from the many prosaic uses of corn, which, because of their very importance, suggest our most frequent and therefore most potent thoughts regarding it. When the average man begins to realize that he is expected to be uplifted by corn-fed thoughts of country the idea is pretty sure to be greeted with a grin. Yes, the saving sanity of American humor may be trusted to keep us from mixing our patriotism with our porridge.

Before endeavoring to trace the further development of the national flower movement let us pause for a moment to review the situation presented in 1892, the Columbian year. Four noteworthy attempts had been made to satisfy the growing desire among our fellow countrymen for a floral emblem which might fitly represent the United States among the nations, and meet the requirements of national celebrations such as the one nearly at hand. Each of these attempts had failed to secure popular approval. Yet these suggestions, and the efforts directly connected with them, were the best results which the national flower movement had to show up to the time of the Columbian year.

At first sight the situation as described may not seem to have afforded a very promising outlook. Yet I believe it can be shown that, in reality, important progress had been made toward fully satisfying the desire for a worthy national flower. A few words will show what I mean.

The problem presented to our people has been an entirely new one. Other nations, it is true, have come to have their floral emblems, but each of these was, as it were, plucked in the childhood of the nation, snatched up as an unconsidered trifle by the way, and worn near the nation's heart while it braved the road of national progress; till, in later days, the little flower became a precious memento of the journey.

The same experience is not for us. Our nation was born with

the marks of age upon it. It had no childhood. Its mission was to seek in this new world the fountain of eternal youth, which has not yet been found.

There are many tokens of the road which leads to these pleasant waters, and one is a certain flower which makes the heart feel young and inspires the noblest yearnings of youth. We may not find this flower except by careful search, nor may we know it except it meet in us an answering wish. Therefore, when we hear one say, "Behold! It is the mayflower," and another, "Nay, but the golden-rod," and a third, "The pansy is the one," and yet another, "We have found it in the maize," let us be glad, for this tells us that the *search* is well begun. Let us rejoice even more to hear still others say, "None of these can be the flower; our search is not yet ended," for this gives hope that the true desire, the touchstone of success, has really come.

My parable, I hope, will interpret to you, moreover, the significance of the next stage in the progress of this extraordinary popular movement. The search for the true flower, once started, aroused in every section of the country a spirit of childlike enthusiasm which led to many supposed discoveries.

I shall not be expected, I hope, to dwell with impartial inclusiveness upon all the suggestions which issued from this Columbian frolic amid the flowers. Many of them are now forgotten, and excited but little interest at the time.

Our present purpose will be served by calling attention to a few specimens which illustrate the most significant types. As will be seen, the lessons taught by the preceding failures had not yet been learned. Certain persons who did not know or did not care that their candidates were the chosen emblems of other nations proposed that we should adopt the rose of England, the clover, recognized as the shamrock of Ireland, the chrysanthemum of Japan, or the lily, which has been so prominently associated with the history of France. Others who still thought, apparently, that our people might be induced to adopt a foreign flower not native to this country, advocated the pink, the pampas plume, and the cosmos. Of the last mentioned candidate one of the newspapers remarked: "Its only claim to nationality is that it was introduced into this country a few years ago from Mexico, by a German florist of Hoboken." The lingering fondness for a weed, even though a foreign one, expressed itself in the proposal to choose

the ox-eye daisy, or whiteweed, which figured as the symbol of the silverites in the late presidential campaign. The poetic feeling that a floral emblem should somehow be good to eat found further expression in the suggestions to glorify the peanut and the potato, while a somewhat similar sentiment urged the grateful recognition of those comfort-bringing foreigners, King Cotton and Señor Tobacco.

To many good people it has seemed that the whole matter depended merely upon personal fondness, and, therefore, as a contribution to the question, they have told the public their favorite flower, it never occurring to them that fitness for national uses should be the first consideration.

Perhaps the most extraordinary suggestion of the time was that we have instead of a national flower a bouquet or garland composed of State flowers. There were those who welcomed the idea as a beautiful compromise, calculated to please everybody. But alas! the more people thought about it the less they liked the idea. It was asked, Supposing every State to have adopted its floral emblem, how could any one ever get together the forty-five flowers, in bloom at different times? If by some wizard's spell such an incongruous medley could be collected, what could be done with it, or how could it be represented in a small space? To this question no satisfactory reply has been made. But for the comfort of those who still see useful possibilities in the idea it should be pointed out that so far as the garland could be used at all it might supplement, but could never be a substitute for, a national flower.

None of these candidates aroused more than a fleeting interest. The pond lily, the larkspur, and our native asters and sunflowers, were somewhat more favored. Asters and sunflowers won support from their wide dispersion and stellar or solar suggestion; but soon two fatal objections appeared. The first was their late blooming; the second, that their blossoms so nearly resembled those of the chrysanthemum of Japan that if used for national purposes in conventional design they would be indistinguishable from that foreign emblem, which to some we might even appear to be copying.

The larkspur was urged because of the red, white, and blue flowers of different sorts, but since there was little else to recommend it, and as in the wild state it was not very widely known, it was but little urged.

The pond lily at first recommended itself strongly by its exquisite form and fragrance and by its time of blooming; but its chances for national favor were nipped in the bud when people came to realize that its petals closed tightly in cloudy weather and at sundown, and that the famous lotus of the Egyptians (virtually their national flower) was a water lily closely similar to our own. It was in vain that one of its advocates pointed out the excellent example which the water lily set to the American people, by going so early to bed.

No little interest was aroused by the suggestions of those who sought to reinforce the growing interest in park-gardening, and the celebration of Arbor Day, by leading the popular desire for a national flower in the direction of some tree or shrub. The oak, the American elm, the magnolia, the tulip tree, the yucca, and the mountain laurel were the principal woody plants brought forward. There was not a little to be said in favor of some tree emblem, especially since Canada afforded us an encouraging example in having adopted the sugar maple. Nevertheless, although the recommendations came from high quarters, there proved to be insurmountable difficulties in the way of a wide popular acceptance of any such idea. Very few of our woody plants grow wild over the greater part of our territory. Nearly all belong to the East or the West, or grow well only in the Northern or the Southern States. The magnolia, the tulip tree, the yucca, and the mountain laurel, for example, are thus restricted in their distribution; the few trees like oaks, pines, and elms which have a wider range are unsuitable for the purposes of a floral emblem because they have no flowers possessing a decorative value. A further difficulty is that the cultivation of any tree or shrub would be scarcely possible to large numbers of our people, who derive, however, much pleasure from raising herbaceous plants. Thus it happened that another group of disappointments came to swell the list already recorded.

Surely nothing could better show the invincible vitality of the popular desire for a national flower than its persistence in spite of all these deferments of hope. Those who thought that the movement had at last exhausted itself in more or less ridiculous futility were entirely mistaken. They might point by way of confirmation to the fact that interest in such matters was being largely directed to the choice of State flowers. But this interesting outcome of the national flower movement, instead of supplanting the original

desire, in reality strengthened it, and at the same time afforded most helpful encouragement.

The problems connected with choosing a suitable State flower are much the same as those involved in a fitting choice for the Union. The main difference lies in the lesser difficulties which go with the smaller territory. It is but natural, therefore, that satisfactory solutions of the State problem should be first attained. Among the flowers which have already been adopted by legislative action as the floral emblems of their representative States the following may be mentioned: The moccasin flower, or lady's slipper, (*Cypripedium*) was chosen by the Minnesota Legislature in a resolution passed shortly before the opening of the Columbian Fair. The next year a bill was introduced into the Legislature of Montana naming the bitter root (*Lewisia rediviva*) for State flower. This bill was passed in 1895. The Columbine (doubtless *Aquilegia cærulea*) has been for some years the recognized floral emblem of Colorado. The matter is being more or less vigorously agitated in many of the other States.

In this work good service is being rendered by the National Floral Emblem Society of America through various local societies which are affiliated within it. The organization was begun at the time of the World's Fair in Chicago, and the headquarters are in that city. As expressed in its Constitution, the aim of the Society is to "obtain a genuine expression of the will of the people" which shall lead to the adoption of a national floral emblem and the selection of State flowers, so far as these have not already been chosen. It purposes through a somewhat elaborate system of appointments and committees to reach every part of the country. One of the best examples of a local branch is the Floral Emblem Society of Massachusetts. This branch, under the able presidency of Mrs. Ellen A. Richardson, has for the past few years been affording opportunity for the advocates of various flowers to present their claims at its meetings. It has also striven to win for us a more rational and edifying celebration of the Fourth of July, and has devoted itself to various other patriotic and educational concerns.

Entirely independent, although in friendly relations with the Floral Emblem Society, is the Columbine Association, which today holds a leading place in the national flower movement. The fortunes of the Columbine Association since its beginning in 1895 have been so closely linked with the progress of the general move-

ment that the history of the one is largely the history of the other. Yet what the Association is accomplishing has come through the concentration of its efforts upon the single aim "to bring about the final adoption of the Columbine as the national flower of the United States."

To trace the development of the columbine idea from its beginning we must go back to the Columbian year, when the search for a national flower was being pursued with keenest interest in view of the approaching celebrations. When every one's thoughts were so largely occupied with matters Columbian it was most natural that the columbine should occur to some of us as being a flower especially appropriate for Columbia's emblem. Once in mind, the idea was found to possess remarkable possibilities which have been unfolding ever since. It is significant that the idea came to several different persons quite independently, at about the same time. In the West, as we learn from recent information, this candidate was suggested by M. Sears Brooks in the Madison "Courier," of Madison, Ind., for Aug. 1, 1891. The principal arguments there advanced in its favor are as follows: "Whenever a flower has been adopted by any country it has been because of some symbolic meaning. Not merely that it was beautiful, but that in some way it represented some historic event or exhibited some characteristic quality. We have such a flower in the wild columbine. First, because it wears our national colors, red, white, and blue. Growing in every section of our country, its color at the South is more often blue; at the North it is white, while in this locality it is red with a golden interior, typical, it would seem, of the blood and treasure expended to secure the Ohio valley to an English-speaking people. The name 'Columbine' is derived from the same Latin word as is the name of Columbus, the discoverer, and of Columbia, which our nation rightly bears.

"Botanically, the wild columbine belongs to the genus *Aquilegia*, whose name is derived from the Latin *Aquila*, or the eagle, ever regarded as the emblem of dignity and might, and adopted as our national emblem. From these facts we see established a symbolic claim for the wild columbine to which no other flower can pretend.

"In its typical character we see that it grows and thrives under the most adverse circumstances. It dances just as gayly upon the bare rock, with no visible sustenance save sun and air, as in the

highly cultivated garden, its only change under culture being a multiplicity of trumpets, one within another, to sound the praises of a free and glorious country. It has all the delicate beauty and power of endurance belonging to American womanhood; all the courage and hardihood of America's noble sons. Even in decay there is no shabbiness; the trumpet-shaped petals fall singly, one by one, beautiful to the last, leaving the central shaft which they protected fruitful with seed for coming generations.

"Graceful in poise, under no circumstances becoming a noxious weed, wearing an air of prosperity as it swings its tiny bells from the crevices of bare rocks, what more can be said of any flower as the emblem of American Independence and Thrift?"

In the East the first public announcement of the idea, so far as I am aware, was by Isabella Carter Rhoades in a poem which appeared Jan. 16, 1893, in the Springfield "Republican," under the title "The Columbine for Columbia." The words of the poem were written to go with our national air, "Columbia, the Gem of the Ocean." They are as follows:

"Emblazoned in panoply regal,
The rose and the lily may shine;
Aquilegia, akin to our eagle,
We claim thee, O wild columbine!
Through Commonwealths five and twice twenty
And States yet in embryo, too,
Scatter widely thy symbols of plenty,
Cornucopias red, white, and blue!

"Thou art red as the East flushed with glory,
Deep blue as the warm Southern skies,
Snowy white as the North's hilltops hoary,
In the West, like its own golden prize.
Ring airily out on the mountain,
Swing slowly thy bells on the plain,
By prairie and cañon and fountain
Elfin fingers wake Liberty's strain!

"Be our lives like thy leaflets well rounded,
Holding truth as their hearts hold the dew;
May our Union, for Liberty founded,
Nurture Justice and Purity too.
O country with future so glowing,
The nations still watch thee afar!
Portion wisely the plenty o'erflowing
From the horns that encircle the star!"

In the "Home Magazine" for March of the same year T. T. Swinburne is quoted by a writer on "The National Flower" as advocating the columbine for reasons similar to those suggested by its earlier champions. By a curious coincidence there appeared at the same time in the "Household" an article by the present writer, entitled "Our National Flower," in which substantially the same arguments, along with others, were set forth.

Finally Harlan H. Ballard, the President of the Agassiz Association, without being aware that the columbine had already been suggested for our national flower, wrote in the "Journal of Education" for April 2, 1896, as follows: "Let us leave the roses white and red with passion to wither on the dusty pages of England's history, but let us adorn Columbia's brow with the columbine, that breathes of dove-like peace."

The conviction that the columbine was the flower of flowers for Columbia's emblem came also quite independently to other persons who made no public announcement, and we shall not be surprised to learn that other original expressions of the same idea have been made in public, besides the five at present known to us. That the same idea should have come to so many at about the same time is an interesting proof of its inevitableness in view of our allegiance to Columbia. The desire to have the columbine as our national flower may be said, therefore, from its origin at this time, to have been a direct outcome of our Columbian anniversary.

The rapidity with which the columbine idea won adherents seemed to confirm the hope that the magic flower, so long sought, had at last been really found. But many another flower had seemed for a while to be the true one, and the task of testing the columbine's qualifications had only begun. But so strong was our faith in the columbine that a few of us, its early advocates, felt impelled to undertake this task.

Our method of procedure was to bring to the attention of leading Americans, representing many diverse walks of life, the main arguments for our candidate, and to ask for their opinion regarding its fitness as viewed in the light of their special experiences. For opinions as to the columbine's horticultural possibilities we went to horticulturists; for proof of its artistic fitness, to authorities on decorative design. And so with the other aspects in which a candidate for the national flower should show itself well qualified. A

few examples will show the character of the encouragement received at that time.

Surely no one could speak with higher authority regarding the horticultural merits of the Columbine than the late Francis Parkman, for three years the honored President of this society. It seems especially appropriate that I now for the first time take advantage of his permission to publish in full the following letter:

50 CHESTNUT STREET, March 25, 1893.

MR. FREDERIC LEROY SARGENT:

DEAR SIR: I have read your interesting paper in the "Household" which is by far the best I have seen in relation to our national flower. Some of your suggestions are very striking and you have won me over to your belief that the columbine is the best choice we can make. I have always been partial to it on its own merits and have raised many hundred seedlings from its different varieties.

It is within the reach of the most modest purse, as it is best raised like the pansy from seed.

Some of the hybrids of *Aquilegia chrysantha*, *A. cœrulea*, etc., are of remarkable variety and beauty and do not require any artificial process of fertilization, as when planted side by side they mutually fertilize themselves.

For my part, in spite of one or two brilliant exceptions, I think that the American long-spurred varieties are by far the best of the genus.

Yours very truly,

(Signed) F. PARKMAN.

Other communications received, and statements in seed catalogues, showed that the columbine idea was being welcomed likewise by professional horticulturists. One of the most significant instances of this practical approval came from Mr. Jacob W. Manning, who took a prominent part in the planting of the grounds at the Columbian Exposition. This gentleman having expressed himself as thoroughly in favor of the columbine for the national flower, we were moved early in 1893 at the instance of Mr. R. T. Jackson to suggest the desirability of making as full use as possible of this plant in the coming displays, if provision had not already been made to that end. We received the gratify-

ing reply that this idea had been anticipated in the plans, and that the columbine would figure conspicuously among the herbaceous plants at the World's Fair.

As evidence of the esteem in which American columbines are held among foreign floriculturists we find that George Nicholson, justly recognized as one of the foremost horticulturists of the world, says in his great "Dictionary of Gardening": "Too much praise can scarcely be lavished upon this elegant genus of plants." Moreover, it is of interest to note that of those species which he especially recommends by "starring" a majority are indigenous to our country. Sir William Hooker, than whom no botanist has ever had a wider acquaintance with the flowers of the world, said of one of our Rocky Mountain species, *Aquilegia cærulea*, "In my opinion it is not only the queen of columbines, but the most beautiful of all herbaceous plants."

In matters botanical we have depended mainly upon statements which have come from the botanists of the Harvard Herbarium. Dr. Gray's "Synoptical Flora of North America," as continued under the editorship of Dr. Robinson, recognizes thirteen species of Aquilegia indigenous in the United States. That there are just thirteen is interesting as a coincidence, in view of the thirteen stripes in our flag, commemorative of the thirteen original States. From this same work we learn that the territory throughout which these native columbines range embraces every State in the Union except perhaps those which border on the lower Mississippi. This remarkably wide distribution is indeed almost without parallel among our native plants, if we except certain weeds.

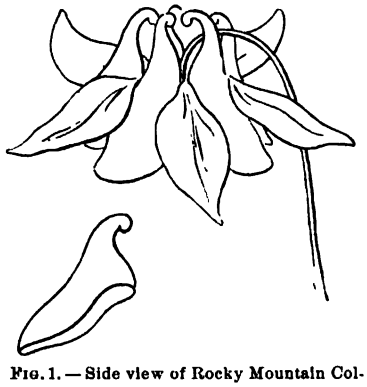

Fig. 1. — Side view of Rocky Mountain Columbine and a single petal detached.

Figures 1–3 will serve to recall the main types of general form assumed by our native columbines. Figure 1 shows the general form in such species as *Aquilegia brevistyla* and *A. saximontana*, both of the Rocky Mountains, and so closely similar to the common columbine of the gardens (*Aquilegia vulgaris*) that when first discovered they were

deemed by botanists to be merely varieties of that Old World species. Dr. Gray recognizes five American species of this type; and the latest works inform us that the *A. vulgaris* itself is now frequently found growing wild in the Eastern and Middle States.

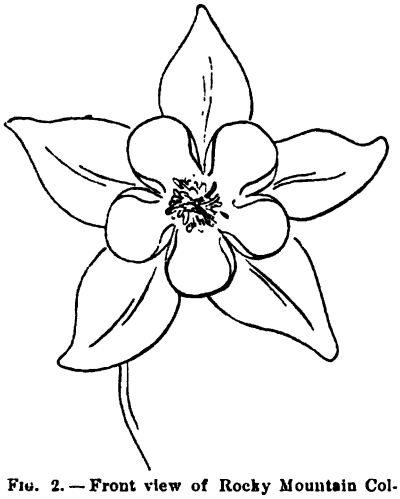

FIG. 2. — Front view of Rocky Mountain Columbine.

It was to this short-spurred type that the names Columbine and Aquilegia were originally applied. The latest dictionaries confirm the view that columbine comes from the Latin *columba*, dove, and was given to the flower because of its resemblance to a group of doves. The same authorities state that Aquilegia is from the Latin *aquila*, an eagle, most probably because when the flower is reversed the curved nectaries suggest the five talons of an eagle's claw. Of straight-spurred forms we have seven species, as follows: the small, red-flowered *Aquilegia Canadensis*, which is the one most familiar in this region; two very similar to this in the far West; another, *Aquilegia cœrulea*, with blue, lilac, or white flowers, often three inches broad and with spurs two inches long; and three, including *Aquilegia chrysantha* and *A. longissima*, with golden or pale yellow flowers, having nectaries like horns of plenty, ranging from one to six inches long. The flowers of all our

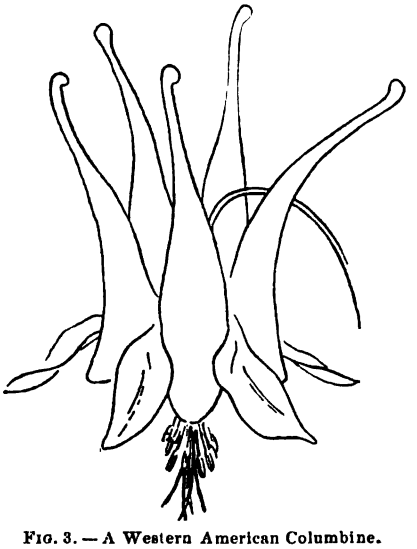

FIG. 3. — A Western American Columbine.

species present in front view the outline of a beautiful five-rayed star, immediately suggestive of the stars of our star-spangled banner. The time of flowering for the whole country is given as extending through the spring and early summer. Thus, as will be seen, columbines are available on our only national holiday, namely, the Fourth of July, which is celebrated in every State; and are at their very best on Memorial Day, when we have most use for a national flower.

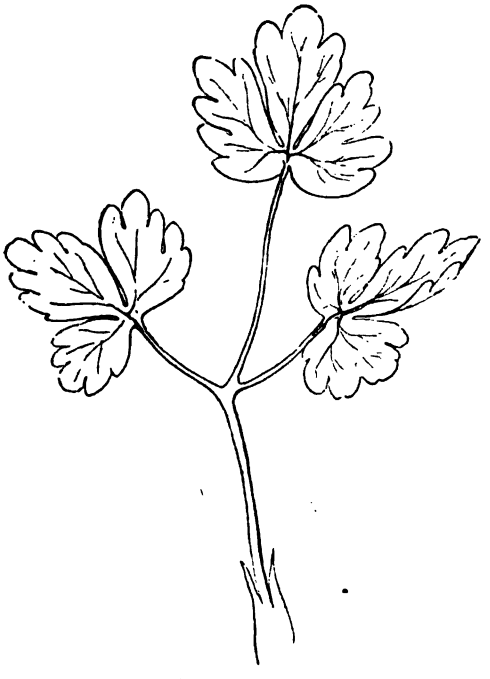

FIG. 4. — Leaf of Eastern American Columbine.

It was felt that from the point of view of decorative design the columbine must possess great advantages, from the fact that its national associations were expressed not only in its name, but in the form and colors assumed by the various parts. Accordingly, this aspect of the flower was brought to the attention of professional designers, and search was made for actual examples of its use in decoration. Only a few of the most interesting results can here be given. Mr. C. Howard Walker, lecturer on Architecture

in the Boston Museum of Fine Arts, and on the History of Ornament in the Massachusetts Institute of Technology, wrote us as follows: "The columbine is the only one of the competitive flowers which is symbolic and can be used decoratively in all its parts. I wish that the public could appreciate the advantage of the choice of a flower which frankly shows its arrangement upon a geometric scheme, and of which the parts are sufficiently simple to be clearly defined, and which also is to be found in more than one color."

We were interested in having our attention called to the fact that John Ruskin in his "Elements of Drawing" chose the leaf of the columbine as an especially happy illustration of the organic beauty which is attained through a well-ordered subordination of parts. His drawing of the plan of the leaf is significant also as showing that the terminal segment is composed typically of thirteen lobes. Thus we see that the leaf as a whole, with its many leaflets of many forms harmoniously related, would remind us of our motto, "*E pluribus unum*," while the terminal group, the leader of them all, would suggest by its subdivision the thirteen original States whose preëminence in the Union we symbolize by the thirteen stripes of our flag. See Fig. 4, Leaf of Eastern American Columbine.

An examination of designs taken from illuminated manuscripts showed us that both the leaf and the flower of the columbine have long been favorite motives with designers. In the decorative work of William Morris, that prince of modern designers, we have found repeated examples of the columbine figuring as a leading element. American designers are just beginning to realize what a treasure of decorative possibilities they have in the American forms of this flower.

American poets we found had long shown a loving appreciation of its charms. It may be safely said that no other of our native flowers has received such tender tributes of affection from so many of our foremost poets. Sometime we hope it may be possible to publish the considerable collection which has already been made. A few short examples must here suffice. Ralph Waldo Emerson says:

> "A woodland walk,
> A quest of river grapes, a mocking thrush,
> A wild rose or rock-loving columbine
> Salve my worst wounds."

In these verses of Elaine Goodale see how vividly its wild grace has been felt:

> "Skirting the rocks at the forest edge
> With a running flame from ledge to ledge,
> Or swaying deeper in shadowy glooms,
> A smoldering fire in her dusky blooms;
> Bronzed and molded by wind and sun,
> Maddening, gladdening every one
> With gypsy beauty full and fine,—
> A health to the crimson columbine!"

No one of our poets has ever helped us more fully to feel the quickening spirit of nature than Jones Very. By many of us his utterances have been treasured as among the choicest outcomes of New England culture. It becomes, therefore, of especial significance that of his collected poems five should be on the columbine. From this wealth we must make a small selection. First, as showing something of the range of thought which this flower suggests, let me quote from his sonnet written about twenty years ago, "On some Blue and Golden Columbines from Pike's Peak, Colorado":

> "O new-born State, what lovely flowers are thine!
> Differing in color, but in form the same,
> From mountain heights has come thy columbine,
> Which shares with ours in beauty and in name.
>
> "Our youngest State may grander scenes disclose,
> Far loftier mountains, parks and vales more fair;
> Yet where the columbine on hillside grows,
> Strange though the scene, one heritage we share."

Finally, in "The Return of the Columbine," he speaks thus of the form familiar to him from childhood around his native home in Salem:

> "In every crevice thou findest a place
> With beauty the rocks to adorn;
> The dark, craggy hillside thou lovest to grace
> With bright hues like the colors of morn.
> And the children come o'er the hills to roam,
> And gather in bunches thy flowers;
> Sweetest tokens they are, in many a home,
> Of their walks, and the glad summer hours.

"Oh, would that the beauty so lavish and free,
And that doth with each season return,
We might with the glad heart of childhood see,
And the lesson it brings for us learn!"

These lines I have quoted especially to recall to your minds the peculiar affection which American children have for columbines. It is preëminently the children's flower, as other poets have told, and as I feel sure the experience of all of us will testify. We have had men and women from every section of the country tell us that there is no other plant which has such power as the columbine to call up the happiest times of their childhood.

These assurances confirmed our belief that at last we had found the magic flower which grows by the road to the fountain of Eternal Youth, wherein is mirrored our nation's true ideal. The columbine had shown its power to make the heart feel young. If our country's name and its mission of peace, if the hallowed symbols on our flag and coat of arms, if an example of dauntless freedom beckoning from the heights of highest achievement, can move us, then will the columbine yield the inspiration which we need. By all these tokens it is Columbia's flower. The road along which it would lead us passes through the bewildering woods where wanderers are lost; yet, by the flower's guidance, we should climb up the rugged sides of the everlasting hills, until, high above obscuring forms, we stand erect on freedom's summit, and feel the continent at our feet. There we should find the columbine, our pioneer, expanding its dove-like wings above the eagle's nest.

Such was the faith, which time only strengthens, in those who founded the Columbine Association. We were a small company, yet believed that success would be given to our feeble efforts, where so many others had failed. We believed this because we no longer could doubt that an important message had come to us to proclaim, and by our love of country and our country's fairest flowers we were bidden to say it forth as best we might.

In the autumn of 1895 a preliminary organization was effected, and by the following spring the Columbine Association was fully established. Since then its affairs have been managed by a governing board consisting of three officers and a council of twenty-one members. In this council are men and women especially competent to advise in the various artistic, literary, horti-

cultural, botanical, educational, and other questions touching our special work. Among these persons are several members of the Massachusetts Horticultural Society. Although the Columbine Association came before the public less than three years ago it has already about three thousand members. These represent nearly every State in the Union. The fact of this rapid increase will, it is thought, lend interest to a brief statement of our plan of work.

Our principal publication is a leaflet stating concisely our arguments and methods. Copies of this, each accompanied by a membership application blank, have been widely circulated by the Association, at a price fixed so as just to cover cost.

Our constitution provides that "The object of the Association shall be to bring about the official adoption of the columbine as the national flower of the United States. To this end, the Association shall undertake to circulate as widely as possible information regarding the unique qualifications of the columbine for Columbia's floral emblem, and in other ways to arouse and direct the interest of our fellow-Americans in this important matter. As soon as the membership shall have become sufficiently extensive to warrant such a step Congress shall be memorialized, and a petition be presented which shall urge the formal recognition of the columbine as an emblem of the Nation."

It is further provided that "membership in the Association shall be open to all, and all shall be welcome," and that "an initiation fee of ten cents shall be required." This small fee barely covers the actual cost of the printed matter sent to the member, which includes two copies of the leaflet, each with its application blank, in order that the member may begin at once to secure new members. Up to this time the profits have been insufficient to permit any free distribution of the Association's publications. No one concerned in managing the affairs of the Association receives any remuneration for his services. All money coming into the treasury is expended entirely for the benefit of the cause.

The most effective means of spreading the glad tidings of the columbine's possibilities has been simply the passing on of the message from one person to another; from this one to a third, and so on and on. But much help has also come in other ways. Various lecturers in different parts of the country have made it their theme. Patriotic and literary societies have chosen it as a

subject of discussion. Not a few of the leading newspapers and magazines all over the country have given their approval and the help of their columns to our candidate and our work, although these same papers had seemed to be unable to take seriously the previous efforts towards securing a national flower.

The quarterly known as "Poet-Lore," the leading magazine of its class in the country, has adopted for its cover a columbine design.

The managers of several charitable fairs have found that a "Columbine Booth" proved a most remunerative novelty. At one of the great fairs given in Boston last winter arrangements were made not only for a Columbine Booth presided over by Miss Columbia, but for a representation of the golden-rod and the Indian corn at other tables. At each the visitors were invited to vote for the flower of their choice, at five cents a vote. At the close of the fair it was announced that the Columbine had received far more votes than the other candidates.

Some of the very best work has been done in the schools. Since nothing can show so well the inspiring power of the columbine idea as its possibilities in the hands of teachers I wish especially to call your attention to a few examples of what they have accomplished. Miss Ida Thayer Weeks, of the Tileston Grammar School, at Mattapan, writes as follows: "In all my experience I do not remember the children so absorbed in anything as they were in this. I talked with them a bit first as to a national flower, what it was, why we should have one, the flowers of other nations, etc., and then I read the leaflet, stopping all along to explain or discuss. The greatest proof, however, which I can give of their interest lies in the fact that when I suggested (in fear lest I should dampen their enthusiasm) that each should write a composition on the subject, not one face fell. Any teacher will understand what I mean, I feel sure. Each has illustrated his writing with pen and ink sketches, but, best of all, each has designed and painted a suitable cover for it. Crude art it is, but done with a most loving spirit." The children's columbine designs, accompanying the letter from which I have just quoted, represented the work of all the class.

To those who are familiar with children's attempts at decorative work it has been a matter of surprise, in looking at this series, that so much individuality and variety are shown. The usually

numerous examples of copying one from another are looked for almost in vain. While, of course, the same elements are used by all, they are managed in strikingly different ways. We cannot account for this except by supposing that the various forms of the flower so appealed to these children, and so invited them, that each felt at once something of the joy of independent invention, and had no need to imitate. From a flower with which unskilled children can do so much we may fairly expect a far more interesting treatment at the hands of professional designers than they have shown themselves capable of giving to the other flowers which have been advocated.

Indeed, the columbine has already formed the subject of some admirable designs besides the ones to which we have already referred. One of the most attractive of recent wall papers is composed of bunches of columbines. Many will also remember the very popular Columbine Calendar which Messrs. L. Prang & Co. produced for 1897. This proved to be so much of a success that a more elaborate one is in preparation for next year. It should be noticed in passing that with these professional designs, even when most conventionalized or lacking in color, it has not been considered necessary to affix a label.

Another way in which the columbine idea has been of help in the schools is by affording a leading feature of the school exhibitions. At the Tileston School the graduating class already mentioned presented as the principal exercise on the programme an animated discussion of the National Flower question, which had been prepared in dialogue form by their teacher. The published reports show that this feature made the occasion one of unusual interest. For the benefit of other teachers this discussion was published in the "Journal of Education" for March 25, 1897. We have heard, also, of its successful use in other schools; notably, in the Pierce Grammar School in Brookline, at the graduating exercises last June. Added interest was gained by having the other numbers on the programme chosen with reference to the general subject, namely, "National Emblems correlated with History, Literature, Music, Drawing, Latin, and French."

This work in the schools we feel to be of especial importance, since the main purpose of the Columbine Association is an educational one. But, as we have already seen, there are plenty of men and women not yet too old to welcome the message we have

to declare, if once they might realize its true meaning. The chief hindrance to many who would otherwise be friendly to our cause is that they do not see clearly just what sort of a plant would fully satisfy their desire for a national flower. We were much helped in our effort to reach these people by the opportunities offered at the National Flower Convention, held at Asheville, N.C., Oct. 21–23, 1896. This convention, called to recommend a national flower for adoption by Congress, was composed of delegates from various States of the Union, chosen by their respective governors, at the request of Governor Carr, of North Carolina. The two delegates and the two alternates from Massachusetts were, through the kind offices of the Secretary of this Society, selected from the governing board of the Columbine Association, and included its President and its Secretary and two members of its council. At the convention the President of the Columbine Association was elected to preside. To the Secretary of the convention, Mr. Edwin A. Taylor, belongs the credit of the original idea of thus bringing together officially accredited representatives of the different States, and to his self-sacrificing and untiring energy was due the final accomplishment of an undertaking unique in the history of our country. Delegates representing a majority of the Eastern and Middle States were present, and a few from the South and West, but it was found impossible at that time to secure the attendance of those from the more distant States. This was largely owing to unfortunate circumstances attending the presidential campaign. Thus the absence of many of the governors on campaign business made it impossible for them to give due attention to the appointment of delegates, and, indeed, a matter affecting so little the great political questions of the hour would naturally give place to more pressing concerns. But, in spite of the fact that a majority of the States were not represented, the deliberations of the convention advanced the national flower movement in important ways. The main result is set forth in the following official letter:

"His Excellency Elias Carr, *Governor of North Carolina:*

"Sir: We, the undersigned, have been appointed a committee by the National Flower Convention, assembled by your invitation in the city of Asheville, the 21st–23d of October, 1896, to apprise you of the results of their deliberations.

"In regard to the main object of their assembly, viz., to decide upon a flower to be recommended in a memorial to the National Congress for adoption as our national floral emblem, they have concluded, after careful consideration, that in view of the inadequate representation of the different sections of the country it is inexpedient to make any recommendation at this time.

"In the way, however, of contributing to the decision of the matter sometime in the near future they have thought it not improper to present herewith a copy of the resolution adopted by them at their first business session for their own guidance in the selection of a proper floral emblem, viz.:

"'*Resolved*, That a plant to serve properly the purposes of a national flower should meet the following conditions:

"'1. It should be a native of the United States, and should grow wild over the greater part of its area.

"'2. It should bloom on one or more of our national holidays.

"'3. It should be capable of easy cultivation in any garden.

"'4. It should not be a weed, or in any way offensive, or harmful to health.

"'5. It should bear what in the popular sense is called a flower, and should not be merely a foliage plant or one chiefly valued for its fruit.

"'6. It should lend itself readily to floral decoration by variety and purity of color and distinctiveness of form.

"'7. The features characteristic of its form should combine such simplicity and gracefulness that, when used conventionally in decorative design, the flower may be readily recognized independently of its color.

"'8. It should be a flower which has never been used by any other people as their floral emblem, and not resemble such a flower in general form.

"'9. It should possess, if possible, patriotic associations plainly connecting it with the best for which our country stands among the nations of the world.'

"While the convention deemed it inexpedient to make any recommendation of a special flower at this time it was evidently the sense of a majority of the delegates present, as shown by an informal vote, that the Columbine, or Aquilegia (sometimes known

as Wild Honeysuckle) is the only flower which meets the requirements set forth in the above resolution.

"We have the honor to be,

"Very respectfully yours,

(Signed) "FREDERICK LEROY SARGENT (Massachusetts),
"W. N. GEDDES (Pennsy vania),
"C. F. CURRIE (New Jersey),
"L. CHAILLE JAMISON (New Orleans),
"HENRY HOLZAPFEL, JR. (Maryland)."

In judging what the convention accomplished it should be borne in mind that this was the first attempt ever made formally to submit the question of a national flower to a deliberative body of representative men and women officially chosen for the purpose. The first and most important step toward a satisfactory solution was an agreement as to the qualifications which should decide the fitness of a flower to be our national emblem. The great need was a clear expression of fundamental principles upon which future discussion might profitably proceed. So fully was this need met by the resolution quoted above that we have yet to hear of any one who calls in question the entire justice of its provision. The convention, in refusing under the circumstances to go further than this and try to hasten the final decision by a recommendation to Congress, was influenced solely by the consideration that the whole country would not be fairly represented by their votes, and that therefore the true progress of the national flower movement would by such action be more retarded than advanced.

It is announced in a recent Asheville paper that arrangements are making for a second National Flower Congress, to be called by President McKinley at Washington, D.C. We await with interest further details from official sources.

As a further outcome of the Asheville Convention there has recently been started by Mr. Edwin A. Taylor an independent society known as the National Flower Council. Its headquarters are at Asheville, N.C. Some of its forms of procedure are closely similar to those which have proved so successful in the Columbine Association. A fundamental difference is in the fact that the National Flower Council claims no special interest in any one flower.

The Columbine Association has been scarcely less fortunate in the opponents it has aroused than in the friends who have rallied to the cause. There is no better test of the strength of an idea than its power to meet gainfully opposing ideas. When, as often has happened, opponents of the Columbine Association have been converted into friends their applications for membership have been none the less welcome. At the risk, therefore, of encroaching on the time allowed for after-discussion of the lecture I trust I may be permitted to state the substance of the worst objections which the advocates of the columbine have encountered. If there are present any of our friendly opponents, perhaps they may be introduced to some aspects of the matter which had not occurred to them; and if in the short time remaining at my disposal I shall be unable to answer to their satisfaction all the objections which have occurred to them I trust that opportunity will be afforded for considering their views more at length.

To facilitate our quest for truth let us imagine an attorney for the remonstrants, who shall have been entrusted with all the correspondence and newspaper clippings belonging to the association, and shall have been otherwise empowered to find out all the adverse criticisms which have come to our ears. We promise that he shall be no man of straw, but shall quote the most damaging evidence he can find.

He begins: A prominent horticulturist of this State expresses the feeling of not a few thoughtful persons when he says that to him "a floral emblem seems superfluous and not a thing to legislate into existence."

We reply: As regards the importance of our having a suitable national flower this present meeting is proof that the leading horticulturists of Massachusetts now hold an entirely different view from that expressed by the gentleman quoted. Furthermore, it shows that by inviting to this lecture other thoughtful people of the community it gives them credit for believing that some importance is to be attached to a matter which touches the public sentiment of this and of future generations, and must affect the opinion which foreign nations are forming of the good taste of our people. Perhaps the gentleman himself has now changed his mind. If he admits that we have reason to be glad and thankful for the beauty and significance of our flag and coat of arms, which make them admired throughout the world, then he stands

committed to the belief that future generations would be grateful to the people of today for the adoption of a floral emblem which arouses the same inspiring sentiments by the language of living beauty — a symbol of symbols, not made with hands. He will not then deem that a superfluous thing which permits our writers, artists, teachers, and our people everywhere, to remind us of our country's highest ideals in an endless variety of beautiful ways not possible by our present heraldic means. If the gentleman had lived in the early days of our country, would he have advised Congress not to legislate into existence such a thing as a flag and a coat of arms?

Our objector continues: What you ask regarding our flag and coat of arms receives an answer much to the point in an opinion expressed by a governor of one of the New England States. The American eagle and the stars and stripes for which he gallantly fought afford all the emblems he wants for patriotic purposes, and he is jealous of anything that might stand as a rival to "Old Glory" and "The Bird of Freedom." A flag is a military necessity; a coat of arms a requisite of government; a national flower is neither. As to the use of such an emblem on postage stamps and the like he prefers to have, as now, the heads of Franklin, Washington, or other great Americans, rather than any floral design.

We reply: The governor misses our intention by supposing that we expect the national flower to compete in any way with our other cherished emblems. This could never happen with us any more than it could with other nations having national flowers. The rose of England does not join in the fight of the lion and unicorn for the crown. The rose with the shamrock and the thistle modestly offsets the grimness of this animal belligerency by touches of significant beauty. Witness the use of these flowers on the jubilee stamps of Great Britain. In this interesting series of postal designs the main feature of all is, of course, very properly a portrait of the queen, while the surrounding ornamentation is much enriched by the introduction of conventional representations of one or more of the flowers mentioned. The designs of our present postage stamps would lose nothing by the addition of the columbine as a subordinate element, and they would gain both in beauty and significance. If our flag is a necessity of war the columbine as an emblem is a necessity of peace. Neither can

truly be said to be entirely indispensable, but both are invaluable as means of inspiring effort to patriotic achievement. Each is fitted to serve its special purpose better than anything else possibly could. We need the columbine for our emblem of peace. Nothing else can so fitly express Columbia's mission as the prophetess of peace, the peacemaker of the nations. No other emblem can hold so persuasively before the people that Christian ideal which prompted our great warrior to say, "Let us have peace."

Again our opponent speaks: We deny that the names of your plant upon which such stress is laid have the significance which you attach to them. Columbine means column-binder, and Aquilegia, according to Dr. Gray's latest work, is from the Latin *aquilegus*, water-drawer, the derivation from *aquila* being, as he says, "an invention."

We reply: These objections might be important if true. It was a long time before we could track that "column-binder" idea. None of the great dictionaries or the special books on plant names even so much as referred to it. They were found to be unanimously of the opinion that columbine comes from *columba* (a dove), of which *columbus* is the masculine form. Finally in an old edition of Stormonth's dictionary we found that after showing how it came through the old French form, *columba*, a dove, he adds, "may be only from *column* and *bine* from Anglo-Saxon *bindan*, Icelandic *binda*, to bind, as in 'woodbine,'" and then tells us that the plant he is talking about is *Aquilegia vulgaris*. This plant is not a vine, and no one ever knew it to bind anything unless perchance it be the hearts of those who love it. All the writers best qualified to judge of the matter evidently consider that Stormonth ought to have known better than to make such a wild self-contradictory guess. Those who have been worrying over Dr. Gray's remarks on the derivation of Aquilegia will find comfort in its correction recently published in the second fascicle of the first part of the first volume of the "Synoptical Flora." On page 463 we read: "Aquilegia. The etymology of the generic name is at best doubtful." The Columbine Association has never claimed otherwise. Our statement from the first has been simply this: "However the name may have originated, it has generally been understood by generations of those who have used it to be connected with the Latin *aquila*, an eagle." For proof of this we have the statements of innumerable writers on plants for over one hundred

and fifty years. This long-established association of ideas no one can doubt. The fact that no one really knows how the name Aquilegia came to be given to the columbine is not of the slightest consequence from our point of view. We are not concerned with the unknown beginnings of the name, but with the vital association which it has come to have and can never lose.

The objector returns to the charge: What you say about these names may be true enough, but how about the specific name, *Canadensis*, which botanists have given to our Eastern columbine? Is not this name with its Canadian significance most unfortunate? We reply: On the contrary all that is unfortunate about it is that so few of our people have ever heard the plant called by that name, and that so many of those who have heard it do not know what it really means. The history of the name is briefly this: Linnæus, the "Father of Botany," gave the plant this name in 1753, borrowing it from Cornut's "Canadensium Plantarum." In those days the region called Canada, as is well known, extended from Quebec to New Orleans. The name *Canadensis* could only mean that the plant grew in this immense region, of which by far the greater part now belongs to the United States. Not a few of the other plants which received the same specific name at that time are never found in the present Canada at all. Many of us are glad to feel that our familiar wild columbine does grow in the Canada of today, for we take it as perhaps prophetic that some day when the columbine's message shall have made Columbia's sway a wider blessing the little plant will no longer be growing on an alien soil.

The anti-columbinist continues: Among the popular names and fancies which have become associated with the columbine there is one which makes it ridiculous; it is called "folly's flower." An early American poet, William Young, speaks of "the columbine with its cap and bells for folly." Mr. Meehan quotes from Miss Twamley to the same effect, and says that even Shakespeare refers to this flower in connection with folly.

We reply: What you say may have some value as a joke, but a sense of humor must prevent any one from taking it seriously as an objection. In the first place it is not true that Shakespeare refers to this flower in connection with folly. Mr. Meehan is entirely mistaken. The two obscure writers whom you mention seem to be about the only ones whose thoughts have turned in

this direction. To them, however, we have reason to be grateful as adding one more to the quaint conceits which this flower has suggested. It has been well said that we love those persons best at whom we may now and then have our little laugh. The principle applies here. This suggestion which leads us to see the cap and bells in the columbine and so make of it a little jester affords an affectionate touch no less welcome than quaint. Our beloved Lincoln, whom Lowell calls "the first American," would have been less truly so without his jokes. So in the columbine — if there was one feature lacking to make it truly representative of all that is best in the American people it was a suggestion of the characteristic American humor. This is now given us in the reminder of the cap and bells, the badge of those invaluable representatives of freedom of speech called fools, perhaps because they were generally the wisest and wittiest men of their day.

Again the opposition speaks: Many complain that our wild columbine is too frail to be useful for decoration, and some urge furthermore that to choose it for a national flower would be to encourage its extermination.

We reply: Wild flowers are very seldom as satisfactory for floral decorations as cultivated ones; hence our need of florists and horticulturists and our gratitude for their achievements. No one who has seen the magnificent exhibitions of cultivated columbines in this hall can fail to recognize them as having all the qualifications necessary for decorative purposes. Like roses they need to be carefully handled, because of the delicacy of form which is an essential condition of their exquisite loveliness. So cared for they are durable enough — more durable than many flowers more widely used — and as durable as the loveliest flowers ever can be. If for any one who shall desire to use columbines on national holidays it shall not have been practicable to raise or to buy them the wild ones will generally be available in the vicinity, and if treated with becoming tenderness will prove a joy far more lasting than the critics would have us believe. Experience has shown that a bunch of wild columbines carefully tended will remain fresh in a vase of water for nearly a week. As to any real danger of exterminating such a plant, it is quite imaginary. For in the first place not only is the plant difficult to uproot, and in certain cases inaccessible, but the free seeding of these individuals insures a good supply of new plants. Moreover, if the columbine should

once become our national flower its rights would be more jealously guarded than ever, and more efforts would be made to sow seeds wherever they would grow. It is not the least of the services which the Columbine Association is rendering to lovers of our wild flowers that it seeks to make two columbines grow where but one grew before.

Our antagonist resumes: You say that Colorado has already adopted a columbine for its State flower. Does not this preclude its use by the country at large?

We reply: Not at all. Colorado's view of the question is well shown by the fact that Governor McIntire of that State is a member of the Columbine Association, and has written us his hearty approval of our plan. If other States should wish to adopt the columbine as an emblem they would of course need to choose some other sort sufficiently distinct from the Colorado one to avoid heraldic conflict. But between the United States and any single State there could never be any such conflict. This is illustrated by the way in which the American Eagle and the Stars and Stripes of the National shield recur again and again in the arms of the various States. Instead of a conflict of emblems the result is expressive of a further bond of union of the parts within the whole.

The counsel for the remonstrants regrets that the time occupied in answering his arguments has already been so much as to prevent him from entering several other protests that he had prepared. Rather than tax your patience further, however, he is willing to rest his case on the following general objection: The advocates of the columbine contend that their candidate is not only the most suitable flower for the purpose, but that it is the only one that can answer the requirements. How can any one be sure that the vast flora of this great country does not include some other flower than the columbine far better suited to our national needs? The great difficulty of answering such a question should make us pause, and indeed call for an indefinite postponement of judgment.

We reply: The question is fair enough, but the difficulty of answering it has been much overstated. Either of two methods will serve. The first was employed by Mr. Geddes, botanical editor of the "Standard Dictionary" and delegate from Pennsylvania to the National Flower Convention. Without prejudice he took Dr. Gray's "Manual of Botany" and went through every plant family, throwing out by a process of elimination all those plants which for

obvious reasons were quite unfit for our national flower. As a result he had just one plant left, the columbine. Moreover he assured us at the convention that before this he had not heard the columbine suggested as a candidate. Any plant not included in Gray's Manual would of course be unknown throughout the most populous sections of the country, and therefore entirely hopeless as a candidate for national flower. The second method is easier. It merely requires one to remember that many persons of all classes in all parts of the country have been doing their best for ten years to have every possible candidate considered, and that especially qualified representatives met to consider deliberately the question of a national flower from every possible point of view. There is no room for the slightest doubt that these delegates as a body were well acquainted with every plant in which the general public could have any interest, and which therefore could for a moment be considered as a candidate for national honor. Of all the flowers mentioned at the convention only one — the columbine — could meet the requirements which the convention deemed indispensable in a national flower. Hence — and the conclusion is inevitable — the equal or the superior of the columbine for Columbia's emblem does not exist. Doubtless the Creator could have made a fitter flower, but, doubtless, He never did.

Before closing, let me very briefly summarize. Each of the columbine's rivals, though precluded, as we have seen, by fatal objections from serving as Columbia's emblem, nevertheless offered some most valuable qualification. Thus, as the columbine connects itself by name historically with Columbus and the Columbian Exposition, so the Mayflower, by its name, recalls the good ship of the Pilgrims. For their widespread distribution, golden-rods, asters, and sunflowers are remarkable as well as the columbine. The golden or the purple tints of these flowers at their best match the columbine's pure yellow and purple, while the latter's near relative, the larkspur, includes among its colors the columbine's red, white, and blue. For inoffensiveness, charm, and ease of cultivation the pansy and many of the old-fashioned garden flowers have endeared themselves as much as the columbine, and for availability in decorative design it may be claimed that such flowers as the mountain laurel and the magnolia are in form hardly less exquisite and distinctive. The valuable suggestion which keeps in view our dependence upon the trees of the country would

be expressed with scarcely less appropriateness by any one of them than by the columbine, their companion, which owes so much to their protecting care. So, in the matter of agricultural supremacy, corn, cotton, and tobacco, as sample products raised on American soil, suggest the same abundance which is symbolized by the columbine's horns of plenty. The columbine, however, has this great merit, that it combines within itself the highest merits of all its rivals. Accordingly it comes as the peacemaker among the flowers. The advocates of other flowers are ceasing to contend with one another and are rallying to its cause, since in the triumph of this they see the realization of more than the highest promise of their former hope. Moreover, in its role of peacemaker, and as preëminently the emblem of peace, the columbine brings the national flower movement into most opportune relations with the present peace movement of the world. In the words of President McKinley, "The citizens of the United States have the right to be proud that their country is in the van in the efforts which are being made for international arbitration." Hence, it especially becomes us to adopt such a perfect emblem of peace as the columbine would be. Not only would this emblem announce to the world the idea of Christian policy which our nation has so long maintained, but it would also, by ever directing the thoughts of our people to the responsibilities of our high mission, aid us in maintaining the right. Thus the columbine idea, born of the Columbian Exposition, — our country's greatest celebration of the victories of peace, — becomes a part of that world-wide movement which the ages shall deem the greatest glory of this glorious nineteenth century.

We of the Columbine Association, who ask you to join us in spreading our message, offer to share with you an ever-brightening hope and a promise assured by past achievement. Our hope is that the columbine will soon win recognition as our national flower — possibly before the beginning of the new century so near at hand. Our promise is this: If you help the cause of the columbine you will be most effectively discouraging what is least worthy of the American people in the national flower movement. At the same time you will be suggesting uplifting thoughts to many of your fellow countrymen and will stir in their hearts some of the noblest and tenderest feelings. Therefore, so far as you can influence these wellsprings of national endeavor, you are helping

to shape the destinies of your country and to further the welfare of the world.

No one who has studied the growth of the popular desire for a national flower during the last ten years will permit himself to ask the question, Shall we have such an emblem? The American people may be trusted to accomplish their hearts' desire. The fundamental question for all of us to decide is this: Shall our national flower be a cause of regret or shame, or shall it be as fitting and noble an emblem as the world has ever seen? We are doing our best to bring the national flower movement to an issue of which our country may be proud. We need your help. Help us!

BUSINESS MEETING.

SATURDAY, March 5, 1898.

An adjourned meeting of the Society was holden at eleven o'clock, the President in the chair.

Charles H. B. Breck, Chairman of the Committee appointed at the meeting on the fifth of February to prepare a memorial of Edward C. R. Walker, reported the following preamble and resolutions, which were unanimously adopted:

Whereas, God in his infinite wisdom has removed from among us one who for many years took a great interest in and labored diligently for the welfare of the Massachusetts Horticultural Society, even so long ago as when the Exhibitions were held in the old Horticultural Hall on School street, and who for three years, from 1847 to 1849 inclusive, served the Society as Recording Secretary, and

Whereas, Edward Charles Rollins Walker further testified to the enduring love he bore the Society by a most liberal bequest,

Resolved, That the loss of one who was so much interested in the welfare of the Society in its infancy awakens our kindest remembrance.

Resolved, That we fully appreciate the esteem in which Mr. Walker held the Society, and that we cherish his memory, would emulate his example, and mourn his death.

Resolved, That these Resolutions be entered upon the records of the Society, and that a copy of them be sent to the family of the deceased.

CHAS. H. B. BRECK,
A. C. BOWDITCH, } *Committee.*
WM. C. STRONG,

Charles E. Richardson presented his report as Treasurer for the year 1897, approved by the Finance Committee. It was voted that the report be accepted without reading.

President Appleton referred to the provision in Section VIII of the Constitution and By-Laws, that the President shall report from time to time what measures, in his judgment, are necessary for promoting its objects and extending its usefulness, and stated that

he was much concerned for the safety of the Library in case of fire. To guard against loss or injury from this cause, he proposed the following vote:

Voted, That the President is hereby authorized to lease rooms in a fireproof building for the use of the Library — in the Tremont Building if possible, or some other fireproof building conveniently situated in the business part of the city, at such cost as shall be approved by the Finance Committee, until such time as the Society shall have erected a fireproof building of its own; the moving to be done under the direction of the Library Committee.

Robert Manning moved an amendment that the subject be referred to the Library Committee, to be considered at a special meeting called for that purpose.

Ex-President William H. Spooner moved to lay the proposed vote and amendment on the table, and this vote was carried.

The President, in further discharge of the duty imposed on him by the above-mentioned section of the Constitution and By-Laws, introduced the following vote:

Voted, That the President be authorized to receive proposals for the bettering of the Society's accommodations by the erection of a new building on the present site, the Society to be put to no expense on account of said proposals; but the President may have such plans as may be offered hung in the Lower Hall for the inspection of the members.

This vote was passed in the affirmative.

The Secretary laid before the Society a letter from Peter Nøvik, Secretary of the Horticultural Society of Norway, acknowledging his election as a Corresponding Member of this Society, and thanking the Society therefor.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were upon ballot duly elected:

FREDERICK LAW OLMSTED, JR., of Brookline,
JAMES F. HARLOW, of Quincy,
JAMES STURGIS PRAY, of Cambridge.

The meeting was then dissolved.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 12, 1898.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following is the substance of the lecture given:

THE RELATION OF OUR PUBLIC SCHOOLS TO RURAL AND URBAN LIFE, AND THE VALUE OF NATURE STUDIES IN OUR SYSTEM OF PUBLIC INSTRUCTION.

By GEORGE T. POWELL, Ghent, N.Y.

In the solution of any great question there are always discovered agencies or influences, which, if properly used, will be found to be closely associated with its successful settlement. There is no subject before the people today more harassing than that of the concentration of population in cities. It is affecting our social, business, and political interests. It is a problem surrounded by great difficulties. Yet, when our all-powerful educational forces are turned upon it there will be found greater promise from them than from any other present known source.

The tendency of the population to concentrate in cities during the last half-century has been marked, and the growth of cities during the last thirty years has been phenomenal. From 1790 to 1880 the population of this country increased twelve times, while that of cities of over eight thousand inhabitants increased eighty-six times. In the past one hundred years the population of New York has increased seventeen times, while that of New York city has increased forty-six times. Albany has increased its population in this same period twenty-seven times, and Rochester sixty times. From 1870 to 1890 the increase in population in New York State was 1,610,000, while the increase in value of real property was $1,659,000,000. In 1869 the value of our farm products was $253,000,000. Twenty years later it had fallen in value to $161,593,000, while the farming land of the State has depreciated fifty per cent.

These facts present some serious problems for the producers of fruits and farm crops. The growth of cities ought naturally to be of great benefit to those who grow food products, but unfortunately

in this rapid growth of our cities there is a large increase of the non-earning and dependent class, filled from the ranks of the unemployed.

It is stated by the Bureau of Labor that forty per cent of those engaged in the organized trades of our State are unemployed, and this is undoubtedly true in most of the large cities of our country. This large army of the unemployed in cities, supported by charity, are not consumers of fruits, and before we can again find ready sale for the products of our orchards and vineyards, at anything like remunerative prices, the problem must be solved of the employment and opportunity to earn a living by this large unemployed class in our cities.

There are today in New York city nearly one hundred thousand of the dependent class, supported by public institutions and by private charity, and in all of the large cities of our country will be found a proportionate number, all of which affect and lessen the consuming power of cities, and become a heavy tax and burden upon their industry and prosperity.

This is not without its effect upon the food producers of the country. The relation that exists between those living in the country and those living in the city is intimate; the prosperity of one depends upon the prosperity of the other.

There are several causes that have long been operating to draw people away from rural living. All have a common interest in the soil. We stand today the richest nation in the world on account of the wealth of our soil. We have been taking from it to support not only our own country, but other nations as well. In the older portions of the country we are feeling a want of this power in the soil itself. It is not as productive as it used to be. The three principal elements, nitrogen, potash, and phosphoric acid, are being removed. One ton of timothy hay removes from an acre of soil plant elements to the value of $5.45. It will be seen that each ton carries that value from the soil to the city. [These figures were shown on a chart which was made some time ago; the figures are a little high for today.] One ton of potatoes carries away plant elements to the value of $2.00, which is mostly in potash; wheat over $7.00. Butter removes the least of any, only about 46 cents to a ton. It is very often found, however, from impurities, that much more is taken away. This shows that butter dairying is inexhaustive. Fruits also carry very little away from the farm. Population

is now leaving the farm because the soil is depleted and farming is unprofitable.

Another cause is bringing agricultural products from interior sections of our country by railroads and canals. Other nations are doing the same thing; bushels of wheat, etc., are being brought out at cheaper cost, and we are obliged to meet this competition. The English capital is reaching into India, Australia, and South America with railroads. In Russia two thousand miles of railroad have just been completed, which will bring out thousands of bushels of wheat. In India wheat costs, to produce, only thirteen cents a bushel; in South America only twelve cents. In India, again, men work for ten cents and women for from three to four cents a day; in South America for from six to ten cents. There are other conditions there vastly different from those existing here. Eight cents will buy enough cotton to clothe a woman for a year. Manufacturing has been largely carried to cities, by railroads offering more favorable rates, and with the natural tendency for people toward community living the present facilities offered by electric and steam railways have brought about a great increase in urban population. Another cause for many leaving farms has been the introduction of improved machinery; that has required less labor to be employed on the farm.

During the winter of 1895 the influx to New York city was so great as to attract the attention of some of its most prominent citizens, who realized that, with the labor market already heavily overstocked, many of this great number coming to the city must drop into the large and rapidly growing dependent class.

Active steps were taken to inaugurate a careful inquiry into the causes that were working to send steadily increasing numbers from the country to the city. The investigation was made with the result that a surprising tendency was found among those living in the country to leave the soil and go to the city. Among other causes were found general discouragement in farming, depreciation in the value of land, low prices for products, churches supported with difficulty, ministers who once had strong congregations in their churches now are obliged to fill as many as three charges, schools declining in number and attendance, the young people leaving the farm. Many school-houses are closed, and the old district school is today seriously on the decline. There are over three thousand schools in New York with less than ten pupils each.

Some recommendations were made for educational work along some special lines, particularly in our public schools, as one of the most effective means of upbuilding the agricultural conditions of the State, and, in time, of holding and even drawing more people to the soil and to country living.

A committee of prominent citizens, known as "The Committee for the Promotion of Agriculture in New York State," was organized, with Hon. Abram S. Hewitt as Chairman, Robert Fulton Cutting, Treasurer, and Dr. William H. Tolman, Secretary; and under the auspices of this committee a series of agricultural schools was held for farmers in Westchester County. During the winter of 1896 a course of lectures on natural sciences, somewhat on the line of university extension, was given in the public schools of the same county. Instructors were sent out by Columbia and Cornell universities. The high schools of the towns or villages, and the district schools, were reached, and lectures given upon the soil, plant, insect, and animal life, with the application made to country living. Teachers and pupils were generally interested in this kind of instruction; members of boards of education and, in many instances, farmers came in to listen to the lectures given in the schools, and they expressed approbation of the plan, which was helpful to the children and instructive to all.

Many teachers will ask, how is it possible to introduce anything more than is already taught? It is not proposed to introduce extra work. Five or ten minutes two or three times a week as incidental instruction, when it seems almost impossible to make progress in the regular work, is the time to introduce a nature exercise. That school hours are often too long is shown by an experiment tried in Berlin. The school superintendent complained that at the end of the school hours the pupils were so exhausted that it was impossible to accomplish the best results. A test was laid out of ten minutes of work with five minutes' rest between. In the first two periods the work was satisfactorily done. In the third period a loss of memory was noticed and errors were found. In the fourth period the errors increased. In the fifth it was useless to try to do further work. The result was a shortening of school hours. If nature studies are brought in in the last period of the day it is a great help to the general work. Children come in better prepared for study the next day.

In New York, text-books are not thought of; the point is to go

to Nature herself. It is of vital importance that teachers know how to introduce methods. For an example of how the teaching is done, seeds may be used. Seeds which represent plant life in the vicinity of the school-house are brought in; also seeds of food products, garden plants, grains, and fruits. If beans are used as many as twelve different kinds can be shown which differ in size, color, and shape. These differences attract the children's attention at once. Seeds of timothy grass may be sent around among the children for them to examine; afterwards a magnifying glass is sent around with the seed. Clover seed is next observed in the same manner. A description of the plants, the root, stalk, leaves, and fruit is called for. An excellent language lesson may in this way be obtained. The teacher draws the plants on the board and points out the difference between them. This principle can be carried through all studies. Chemistry can be taught from the different elements which enter into the plant during its growth, and which are required to feed it. Physiology can also be studied through the agency of plants, and it can be shown that clover contains the elements required to give young animals strength, and should remain on the farm, while timothy is deficient in right food elements for young animals, but gives the necessary food for older animals, and should go to the city, where the older animals are found. Children can be taught why clover is so valuable to renovate the soil by showing them plants which have nodules on the roots, and giving lessons on how these nodules take the nitrogen from the air. If our farmers of half a century ago had understood this it would have been worth millions of dollars to the country. An interesting experiment was tried in 1896 in connection with the study of plants. We made this offer to all children of the schools of Westchester County, who would be interested in a practical and systematic way of studying a plant, that on application from them, in the spring, we would send them by mail, free of cost, half a dozen strawberry plants.

The children were to set the plants, a small circular being sent giving a few directions to aid in setting them properly. They were to learn all they could about the growth and habits of these plants, and they were required to write compositions on what they were learning and give the same to the school.

Large numbers of applications came in from boys and girls for

the plants. The pupils of the grammar schools of New York and Brooklyn observed in the papers the notice of the offer, and they sent in applications, some saying in their letters that they had no garden or soil, but they would get boxes of earth, put the plants in them, and place the boxes on the roofs of their houses. The offer of plants to the school children of Westchester County was copied by the agricultural and local papers of the State, and applications came from school children and teachers in almost every county in the State.

Nearly two thousand strawberry plants were sent to city children, and over ten thousand to those in the rural districts of the State, which was striking evidence of the interest children felt in taking up the study of a plant when proposed to them that it should be with the plant itself rather than from a book.

The strawberry was chosen because it is an interesting plant in itself; its blossoms are beautiful, and there is a marked difference in them, as some are fruitful and others, because of their construction, are not. The different parts of the flower were shown and explained upon printed charts in the lectures given in the schools. The economic value of the plant was also treated, and in addition to its beauty its possibilities were presented in furnishing support and income to those who skilfully managed it.

In many instances the study of insects was connected with that of plants, and the chief enemy of the strawberry, the white grub, was illustrated upon the same chart with the plant. The May beetle or June bug, which is the same, is the progenitor of the white grub that does so much damage to strawberry beds, and the life history of this insect was given in connection with the study of the plant. This never failed to give added interest to the pupils in the presentation of the subject.

The most practical way to teach is through an object lesson. Apples which are diseased or wormy, if shown to the pupils, will lead the way to a lesson on apple insects and diseases; the story of these insects or diseases can be told, and charts can be used to illustrate the story. Ten years of this sort of study will enable us to produce a race of intelligent and skilful farmers.

In the lectures given the thought of the possibilities of improvement of rural life through the schools was made prominent. The most familiar subjects connected with the farm and home and those surrounding the school were chosen.

The schools in the great orchard districts of the State should give some instructions to those living in and surrounded by this great industry that would help them to understand and know something of the fungous diseases and insect enemies that annually bring from fifty to seventy-five per cent of loss because of want of knowledge upon these subjects.

M. V. Slingerland, assistant entomologist of Cornell University, has estimated that the loss to the apple and pear growers of New York annually caused by the codling moth is fully $3,000,000, while Dr. J. A. Lintner, the State entomologist, estimates the loss to New York annually from all insects to be $26,000,000. Massachusetts furnishes in the gypsy moth an illustration of the damage that one insect may do and the cost of its control or extermination. Ireland is today pinched and suffering, and seriously threatened with famine from the failure of the potato crop, caused by a fungous disease that is readily controlled, but not understood by those who are growing that important food product.

Our public schools can do much to build up agriculture and bring a higher degree of prosperity to those who live in the rural portions of the State. Nature study is not to be introduced in our schools for the purpose of educating boys and girls to become farmers and fruit growers. It is to give a new inspiration and interest in the study of all subjects, and while the study of the soil upon which all depend for existence, and the study of animals, plants, and insects, will especially help those who do live upon farms, in the larger knowledge that will come from this study it will be of value to all, whatever the future occupation or living may be.

The value of this rational kind of instruction was so widely recognized that the demand for it throughout New York State became unexpectedly large.

Prof. L. H. Bailey, in 1896, was conducting a series of horticultural schools, under what is known as the Nixon Appropriation, made to Cornell University for the promotion of horticultural knowledge in the Fourth Judicial Department of the State. He arranged for a series of lectures, to be given in the public schools of this department, comprising twenty-two counties. The lectures on nature topics were to be given on the plan inaugurated in Westchester County, able instructors being furnished from Cornell

to assist in the work. In this broader field the instruction was enthusiastically received at every point.

The Committee for the Promotion of Agriculture, realizing the importance and value of extending this instruction to the whole State as one of the most effective ways to improve the condition of the rural population, turned its work over to Cornell University.

It was felt that with the strong equipment of scientific instructors in agriculture Cornell could best meet the needs of the State and fulfil the object of the committee in its investigation, to institute means that would eventually tend to equalize population, check the great flow to cities, and hold the people more prosperously and contentedly to the country. During 1897 Cornell has had several instructors in the field.

A large number of schools have received lecturers, leaflets have been issued as helps to teachers in the presentations of nature subjects, and teachers' institutes have had special instructors to give methods in nature teaching, the Department of Public Instruction coöperating in this progressive educational movement.

While the condition of the agricultural population of New York and New England has been one of discouragement and depression for the last quarter of a century, there may be said of New York that there is an uprising of educational interest at the present time such as has never before been known. There is an earnest desire to throw off old conditions; there is an active demand for knowledge, and a spirit of inquiry is everywhere marked. Greater knowledge and a broader education are newly felt as one of the greatest needs in farm life, and the effort to reach this through our public schools is meeting with hearty and universal support. A few years of the present line of instruction given in our schools will greatly aid in the permanent upbuilding of all interests of the State and of society, both rural and urban.

Discussion.

The President said he had just attended the fifty-sixth anniversary of the Worcester County Horticultural Society, and that a speaker there referred to the great value of such lectures as we have had today. The cultivation of the power of observation might be the salvation of the country.

Philip Emerson spoke of chrysanthemums which had been given

children at Natick by the gardeners of some of the large estates in Wellesley. The results which the children obtained were surprising, and much better than the gardeners thought possible. He said that the growing of beans and similar seeds had been encouraged in the upper grades, and thought that if some committee could send out practical directions for nature studies the schools would gladly take the matter up.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 12, 1898.

A meeting for Lecture and Discussion was holden at eleven o'clock today, Vice-President CHARLES H. B. BRECK in the chair.

The following lecture was delivered on the John Lewis Russell Foundation:

THE RESISTANCE OF PLANTS TO PARASITIC FUNGI.

By EDWARD A. BURT, Ph.D., Professor of Natural History in Middlebury College, Middlebury, Vt.

Fungi are defined as plants with vegetative body not differentiated into stem and leaves; and they do not contain the green grains called chlorophyll. Fungi are propagated by spores, or by portions of the vegetative body, some one or all of which may give rise to an independent plant or plants.

Place of Fungi in the World's Economy. — During the present decade so much is being published on the destructive work of parasitic fungi that the general reader must be on his guard, lest he conclude too hastily that all fungi exist in this world merely to cause disease or perhaps death of more highly organized plants which might produce food for the animal world or contribute to its æsthetic gratification. When the horticulturist has his carnations destroyed by the rust, his seedlings ruined by the damping off fungus, his peas produce a crop hardly worth the picking through the mildew, his potatoes a failure by the rot, his apples and pears of an inferior grade by the scab, and perhaps his family brought to the verge of death by diphtheria or typhoid fever, — when he realizes that all these troubles and many others which your own experience may suggest are due to fungi, it is no great wonder that he sees but small compensation in the crops of mushrooms which

he has grown, and is tempted to conclude that fungi could be spared from this world. But he might with equal reason conclude that the rains of summer are of no avail, because they gully his fields, sprout in the shock the harvested grain, and drench himself to the skin.

Fungi have an important and a peculiar work in the world's economy. The green plants which contain chlorophyll are constantly converting carbon dioxide, and the earth's available store of inorganic matter in the soil, such as water, soluble phosphates and nitrates, salts of potassium, calcium, iron, etc., into complex organic compounds of thallus, fructification, stem, leaf, and root. A portion, and only a comparatively small portion of the whole, of this organic matter, at various times in the course of its formation, is used as food by animals and is broken up into simpler compounds and returned to the soil. At the end of the season or at death of the plants the unused plant matter is left to accumulate on the surface of the earth. We can form some idea of the amount of this accumulation for a single season by the abundance of dead leaves on the ground in autumn in our streets and forests, and by the dead stems and leaves of grasses and weeds which may stand knee-deep or waist-deep in some field left undisturbed by man and his flocks. As trees and other woody plants die their trunks and branches become a part of the accumulation on the ground, as we see in primitive forests.

If kept permanently in the form of dead leaves or dead wood organic matter would be of no more value to the soil than any other covering. Its stores of carbon, nitrogen, potassium, phosphorus, etc., are not in forms available for use as plant food, by the green, chlorophyll-containing plants. Decay must take place first; that is, the complex molecules of insoluble organic compounds must be broken up into simpler, soluble forms. Could decay and the consequent return of food matters to the soil be prevented, in the natural order of things the soil would lose its stores of plant food and become covered by a deep accumulation of dead organic matter.

Fungi are the causes of decay. They thrive in moist places and light is not essential to their growth. The dead leaves and wood of the higher plants, and all dead organic matter which is not kept too dry for their growth, or at too high or at too low a temperature, or without special protection, is soon attacked by myriads of

fungi, ranging from microscopic Bacteria and Moulds through minute Ascomycetes to conspicuous Basidiomycetes, such as species of mushrooms and Polyporus. Fungi make prompt return to the soil of plant and animal remains which would otherwise be withheld from it. The soil does not contain such an abundance of plant food that the work of such fungi, called Saprophytes, can be dispensed with.

While most fungi are saprophytes and have to do only with dead organic matter, still very many others are to be found in more intimate contact with living organisms, and more especially with the higher plants. In some cases the higher plant suffers by the contact, and then we apply the term *parasite* to the fungus; in other cases the higher plant, or perhaps both organisms, gain by the association, which is then called *symbiotic*. We can consider the latter relation but briefly.

Symbiotic Fungi. — It has long been known that growing leguminous crops, such as clover and peas, increase the amount of nitrogenous matter in the soil and can be advantageously used for its improvement in a rotation of crops. The source of the nitrogen of these compounds is the free nitrogen of air circulating through the soil. It is only within a dozen years that it has been established that the fixation of the nitrogen into compounds is due to the presence in the soil of fungi of a low order. Small tubercles form on the leguminous roots at the points where the fungi are in contact with them, and at these points the fungi yield nitrogenous substance to the roots and appear to receive starch compounds in return. We are too near this discovery to see its real magnitude, but, in its economic aspects, it will probably rank as one of the great discoveries of the century.

Leguminous plants are, perhaps, not the only ones directly dependent on fungi for food to some extent. The investigations of the last few years indicate that many plants and even trees, as the Coniferæ, growing in a soil largely composed of humus, are deficient in root hairs, and are clothed instead with a fungous growth of mycorhiza. The whole subject is in the field of active study at present, but it seems to be established that the fungus supplies food matter, presumably from the humus, to the higher plant. But when we reflect on the fact that the saprophytic fungi are converting insoluble and highly complex organic compounds into the soluble plant food of the soil, why should we not expect to find

some of the higher plants which use this food in close association with the agents supplying it?

With the conception which has been briefly outlined of the place of fungi in the world's economy we now turn our attention to fungi in their injurious relations to higher plants — to cases where the fungus anticipates the death of the higher plant and lives a parasitic life.

Parasitic Fungi. — Parasitic fungi are those which, stimulated by the cell contents of another living plant, penetrate wholly or partly into its tissues, and draw their nutriment from that source. *Obligate parasites* can live only in the parasitic condition; *facultative parasites* can live wholly or partly as saprophytes, and, under favorable conditions, exist wholly or partly as parasites.

Parasitism depends on the possession of a combination of characters by the fungus, adapting it for invasion of, and for maintaining itself in, the host, and on the lack, or presence in too slight degree, in the latter of means for repelling the invasion or destroying the invader. In many cases the contesting plants are so equally pitted that external conditions, as wounds, periods of wet weather or of drought, cold nights, or the presence of a fungicide, give to the favored contestant the decisive advantage. The requirements for the fungus are:

1. Ability to maintain its life during the critical period of germination from the spore and for an interval afterward. During germination, and usually for some time afterward, the incipient organism is wholly dependent for food on the supply contained in the spore.

The spore, however, is only a single cell or a group of cells, each capable of independent germination. The spores are produced in vast numbers. In size they are like the finest dust, having a diameter in some cases of only 1μ ($\frac{1}{25000}$ in.), but usually averaging ten times that size. Each contains a nucleated mass of protoplasm, except in the bacteria, and carries but little food substance.

In order that the spore of an obligate parasite may infect a plant it must fall on a suitable species and then germinate and throw out a germ-tube which can penetrate the host and obtain food from that source in the short time for which the original supply of the spore is available. This is a very critical period in the life history of a parasitic fungus, and only a very small

proportion of the germinating spores can survive the ordeal if the environing conditions are at all unfavorable. Too dry an atmosphere immediately after germination deprives the would-be parasite of its moisture and kills it. An equally fatal result follows if the delicate germ-tube has to creep over a surface coated with poisonous copper salts or other fungicides; this is the philosophy of spraying against fungi as now practised in horticulture.

2. After germination the fungus must be able to make its way through the defensive structures on the outer surface of the host. This is the second requirement which the fungus must satisfy, but this will be taken up later on in connection with the host plant.

3. The fungus must be able at the least to hold its place in the tissues of the host and to draw its supplies of food from that source, in spite of the resistance encountered.

The plant attacked is a complex structure, the result of cumulative successful variations of a long line of ancestors before man began its cultivation. A stream of water containing plant foods in solution enters the plant at the roots, passes the length of the stem, and emerges from the leaves and other aerial surfaces in the form of a vapor, usable and non-volatile portions of the stream being retained. Primarily, the structure of the plant is adapted to the maintenance of this food-supplying stream; the root surface is adapted to its absorption; the leaf structure to its transpiration; and the stem structure and surface to its transfer from root to leaves with the minimum of evaporation. At the roots and at the leaves and young shoots the structural requirements for absorption and transpiration of the stream are opposed to the formation of a covering impenetrable by parasitic fungi; nevertheless we cannot but believe that the attacks of these fungi have been to some extent a factor in the evolution of structure of the higher plants.

The nature of the attack made by fungi against each surface of the host, and the resistance which is encountered, may be considered with advantage in connection with some common diseases which have been best studied.

The Root as the Region of Attack. — For a short distance back from their tips the smaller roots and rootlets have their superficial cells with thin uncuticularized walls through which water is readily absorbed. Lateral outgrowths of these are the root hairs. This

outer layer is soon cut off from the internal tissue of the root by the formation of a deeper seated cork layer, which gives to the older roots a bark, or protective covering, very similar to that of the corresponding stem, to be described further on. Infection of the root may therefore occur by plant structures able to bore through the mechanically resistant covering of cork, or by organisms able to penetrate the root hairs and get deep enough into the interior of the root so as not to be shut out by the formation of cork. We will consider first the latter mode of infection.

Plasmodiophora Brassicæ, the fungus causing club root of cabbage, turnips, and other Cruciferæ, is one of the most successful fungi attacking plants at the root. The disease attacks young seedlings and older plants; its symptoms are shown in from three to five weeks by the wilting of the leaves, which become lighter colored and rather yellowish. The characteristic swellings may then be found on the roots. Cabbages suffering from this disease fail to head.

If thin slices, cut from one of these swellings with a razor and placed in a drop of water on a glass slide and covered with a cover glass, are then examined with a compound microscope, the fungous cause of the disease may be seen. Many cells of the root are swollen to many times their usual size, and they contain the fungus in different stages of its development. Some show it in a plasmodial stage, with its young protoplasm only partially filling the cavity of the cell; in others the plasmodium is fruiting and becoming a mass of minute spores. If sown in water these spores germinate in a few hours, producing motile, ciliated swarm-spores. The ciliated swarm-spores infect sound plants, it is believed, by penetrating their root hairs and passing from thence into the deeper cells where starch is stored. Such penetration has not yet been observed, however, and it may be that they gain access to the interior of the root through punctures made by worms and insects, but the former mode seems the more probable.[1]

This disease is especially troublesome to truck growers, because they do not practise a long-period rotation of crops. Roots or portions of roots infected with the fungus are left in the ground or on its surface when the crop is harvested. The spores are liberated through decay of these roots, and they remain alive in the soil for several years. If another crop of cabbages or turnips is

[1] Eycleshymer: "Club-root in the United States." "Journal of Mycology," 7: 83.

planted in this soil the following season it becomes infected at once, and so the disease is propagated from year to year.

Halsted announces that air-slaked stone lime is an effectual preventive of club root, and the best so far found. It should be used at the rate of from seventy-five to one hundred and fifty bushels per acre, and spread on the ground in the fall, and not turned under until spring to insure the best results. Applications should be made every other year to severely clubbed land on which turnips or cabbages are grown yearly.[1] This method of treatment seems well adapted to the needs of market gardeners.

Not much is known of the resistance which plants offer to infection of their roots by Plasmodiophora. The cabbage and the turnip seem quite helpless when pitted against it, judging by the certainty with which the fungus wins. That some resistance is offered may be inferred from the fact that all species of Cruciferæ are not equally susceptible to the disease. Halsted[2] has made observations on the comparative susceptibility to club root of sixteen species of Cruciferæ. He finds that charlock is the most susceptible on his list; white mustard, second; penny cress, third; shepherd's purse, seventh; black mustard, ninth; and so on. One is surprised to note that charlock, *Brassica Sinapistrum*, one of our commonest weeds, is the most susceptible species on the list. Club root is fatal to the cabbage and turnip. How is this weed able to survive? Its survival affords an object lesson for the horticulturist. Its seeds are produced in abundance and become widely distributed. Not all fall in an infected seed-bed; but those which do suffer the penalty. Many lodge in ground free from the fungus, and there they grow and perpetuate their kind. Dissemination of seeds should be regarded as one of the adaptations by which a species, in some cases, may successfully resist extinction by a more powerful fungus.

Infection of the root is more usually by mycelium, which creeps through the ground from root to root only a few inches below the surface. A "root rot" of some kind is the result, as of the grape by *Dematophora*, of the pine by *Armillaria mellea*, and, perhaps, of the beet and alfalfa by *Rhizoctonia*. One of these fungi, *Armillaria mellea*, the honey mushroom, is very common in our woodlands in

[1] N. Jersey Ag. Exp. Sta. Rep. for 1894, pp. 285 and 288 (1895); and Rep. for 1896, p. 306 (1897).

[2] N. Jersey Ag. Exp. Sta. Rep. for 1896, p. 309 (1897).

September, growing about stumps. The pilei arise from black, root-like strands, called rhizomorphs. Hartig[1] finds that when the fungus is well established in a root system rhizomorphs grow out and extend through the ground often for a distance of several feet. If they come in contact with the living root of a pine they are able to bore their way into it. Then the individual hyphæ of the rhizomorph spread through the resin ducts and medullary rays to all parts of the roots and stump, killing the tree and producing a form of decay called "white rot." *Armillaria* is very common as a saprophyte. Hartig states that it is a very destructive parasite on all conifers, and also on *Prunus domestica* (common plum) and *P. avium* (Mazzard cherry).

Epidermal Covered Surfaces of Leaves and Young Shoots as a Region of Attack. — The leaves and younger portions of the stem of woody plants, and the whole stem of herbaceous plants, are covered by colorless transparent cells arranged side by side, in most plants in a single layer, called the epidermis. The outer wall of the epidermis is cutinized, *i.e.*, naturally waterproof. This waterproof covering prevents rapid evaporation of moisture from the tissues of the living plant, and their consequent desiccation. As already stated, water vapor is constantly being exhaled from the epidermal-covered leaves and shoots, but it is by a regulated transpiration from deep-lying cells, and it emerges through openings in the epidermis, called stomata. The stomata open and close automatically, regulating the transpiration stream to suit the needs of the plant. In dry weather the stoma is nearly closed; in wet weather, with the atmosphere nearly saturated, the guard-cells of the stoma become turgid with water from the root, more spherical in form, and give a larger opening for the stoma.

While the epidermal covering prevents the plant from excessive drying it is also of great importance as a means of resistance to fungous invasion by withholding moisture from the fungus spores on its outer surface, and by interposing a barrier which must be pierced. As the epidermis is waterproof the spores which lodge on its outer surface can receive no moisture from the succulent tissues of the plant, but are entirely dependent for moisture for germination on that which condenses on the leaves as dew or falls as rain. In dry weather spores are very apt to fail to germinate, or if germination does occur in the short period during which the

[1] "Diseases of Trees." Eng. trans., p. 209, 1894.

leaves are wet with dew the delicate germ-tube, less able to retain its moisture than the spore, is likely to perish on the following day. If the leaf has a waxy surface or a form likely to cause the moisture to collect in drops and fall from the leaf, this is an additional advantage against infection.

On the other hand protracted rains, not so violent as to wash the spores from the leaves, or murky weather with frequent showers and the air nearly saturated with moisture, favor germination of the spores and enable their germ-tubes to attack the epidermis with full vigor or to grow over its surface to a stoma. In such weather the stomata are also widely open, as already stated.

Penetration of the Host. — The behavior of the fungus immediately after germination varies with the species. In the powdery mildews (Erysipheæ) forming white coatings on leaves and young shoots, as of the pea, rose, and lilac, the germinating spore gives rise to a cylindrical thread-like body, called a hypha, which branches and spreads over the surface of the epidermis. From points of the hyphæ, in contact with the epidermis, branches push down directly against the epidermal cells, cause minute openings in the wall, and through these gain entrance into the protoplasmic part of the cells. Here the end enlarges. Such branches are called haustoria. Through the haustoria the fungus draws its sustenance from the host, while the main body of hyphæ remains on the outside, forming the familiar white patches.

These powdery mildews are easily destroyed. Any substance poisonous to the fungus, but not injurious to the host, may be used for the purpose, as flowers of sulphur dusted over the leaves.

Most parasitic fungi gain entrance to the deeper lying tissues of the host as soon as possible after germination. In some cases the germ-tube creeps along on the surface of the leaf until the end reaches a stoma and then curves through this into the intercellular space beyond. The æcidiospores and uredospores of the rusts illustrate this mode of penetration. In other cases the germ-tube may grow directly through the epidermis into the underlying tissue, or, more rarely, it may grow down through the epidermis in the partition wall between its cells.

The young leaves and tips of branches are more susceptible to infection than the older parts. The common corn smut can infect only the young seedlings and other immature parts of the Indian corn. These young portions of the plant are tenderer than they

are when older, their cell walls are thinner and less strongly cutinized, and they probably offer less mechanical resistance to penetration by the fungus, and are more permeable to ferments secreted by it. From these differences in susceptibility of young and old epidermal-covered organs we may infer the nature of the resistance against fungous attack afforded by the fully developed epidermis, and how excellent a protection it is under normal weather conditions.

Bacterial Brown Rot of Cruciferous Plants. — We have now to consider a disease of great interest, because the infecting organism so successfully avoids the outer defences of the host. I refer to the bacterial brown rot of cabbages and other cruciferous plants, which was first described, and its cause determined, by Pammel,[1] and has recently been more fully studied by Smith.[2] The bacteria, *Pseudomonas campestris* (Pammel), Smith, causing the disease are believed to become scattered over the leaves with the dust or to be left there by insects crawling on healthy plants after they have been on, or perhaps biting into, diseased plants.

The cabbage has openings, called water pores, along the margins of its leaves. During cool nights in summer the roots absorb more water than can be transpired from the leaves, and it accumulates in their cellular and vascular tissue under sufficient pressure, so that it finally oozes from the vascular tissue through the water pores and stands in drops along the edges of the leaves.[3] As the water accumulates along the margins the bacteria which happen to be lodged there simply swim through the pore into the leaf and spread the disease along the vascular bundles. Infection also occurs by the bites of insects which have been feeding on diseased plants. The spread of the disease is shown by the brown veining it causes, which contrasts against the dark green of the leaf. Both these ways of infection are exhibited in a specimen which you may examine, and for which I am indebted to Dr. Smith. From fifty to one hundred and fifty separate infections were often seen on cabbage plants in widely separated localities.[4]

Bark-covered Surface of the Stem as a Region of Attack. — The epidermis of woody stems usually becomes disorganized in a

[1] Iowa Agric. Coll. Exp. Sta. Bulletin, 27 : 130, pl. 1, 1895.

[2] "Centralblatt f. Bakt., Par. und Infekt.," 2 Abt., Bd. 3, pp. 284, 408, 476, pl. 6., 1897.
"The Black Rot of the Cabbage." "Farmers' Bulletin," No. 68. U.S. Dept. of Agric., 1898.

[3] Vines: "Text-Book of Botany," p. 699, 1895.

[4] "The Black Rot of the Cabbage," p. 6.

few years, and is replaced by bark, largely composed of cork. Although certain openings (lenticels) through the bark for aeration make places for lodgment of many Ascomycetous fungi; nevertheless the bark, as long as intact, affords an effectual barrier against parasitic fungi very destructive to wood. Breaks through the bark occur frequently, however, as by the boring of insects, the gnawing of animals, the breaking of branches, bruises of implements of man, and improper pruning.

An attempt at repair of these wounds is made by the natural processes characteristic of the plant, as by the formation of cork or of callus and new cambium. If the wounded surface is large, many years will be required for it to heal, and during all this time it is liable to infection. Coniferous trees, as the pine and the spruce, which are especially subject to attack, pour forth a pitch from wounded surfaces of the sap wood. This gradually hardens, and forms a protective covering, although the heart wood, which is destitute of pitch, may remain exposed to infection, if the wound is large. The deciduous-leaved trees which we cultivate lack such a natural ointment for their wounds. We can make good the deficiency by applications of grafting wax, coal tar, or paint, to their wounded surfaces, and greatly diminish the risk of infection. When large branches have to be removed from a tree they should be cut from it so close to the trunk or to some vigorous branch that liberal food supplies will be available for rapid growth about the edges of the wound. Dead wood projecting from a living tree and raw wounds furnish places for infection by the spores of parasitic Basidiomycetes. We often see the bracket-shaped fructifications of these fungi standing out from dead places in living trunks of trees, and becoming larger year by year as their hyphæ spread through and destroy the living wood of the trunk.

The Fungus in the Interior of the Host. Growth of the Fungus and Effects produced. — A germ-tube or hypha, reaching the interior of the host, branches and forms a mass of hyphæ called collectively a mycelium. Many fungi have a mycelium which extends for only a very short distance beyond the point of infection and causes merely local disease. This is the case with many "spot diseases" of leaves, which often, aside from their disfigurement of the foliage, apparently cause no more injurious effect on the plant as a whole than would result from the destruction of the same areas by insect work.

In other diseases the mycelium may spread more extensively from the point of infection, causing serious disturbance, or death of whole organs or the entire plant. *Armillaria mellea* destroys the root system of conifers, and causes death of the tree. *Pythium De-Baryanum*, the best known damping-off fungus, spreads over the ground of the seed bed, and kills seedlings by infecting and destroying their lower parts usually.[1] *Phytophthora infestans*, the late blight, or potato-rot fungus, spreads with great rapidity through the plant. Its infection is likely to occur in the leaves.

The hyphæ forming mycelia grow either between the cells of the host, usually giving off haustoria laterally, which pierce the adjacent cells and absorb food, or, in other species, of which the potato rot (Phytophthora) is an example, they may push directly through cells in the way. Destructive effects may immediately follow infection (Phytophthora), or the fungus may live for a long time in the tissues of the host, extending its mycelial system, and drawing food supplies by haustoria, and then abruptly form its fructifications, at the same time killing the infected tissue.

Different parasites absorb different substances from their hosts. Attention has been called already to the fact that the powdery mildews penetrate the epidermal cells, with their haustoria, and absorb through their delicate walls portions of the nutrient matters of the protoplasm. The reserves of starch which accumulate in the cells of the host are an especial object of attack with the potato-rot fungus, Phytophthora, and with many wood-destroying fungi.

The cell wall is also a chief object of attack by wood-destroying fungi. They "rot" the wood. Lumber dealers have several terms descriptive of the kind of rot characteristic of the species, as red rot, white rot, dry rot, etc. *Trametes Pini* produces "ring shake" in pine wood. The hyphæ of this fungus act first on the lignified portions of the partition wall, dissolving and absorbing first the middle layer (primary membrane) of the wall, and thus loosening the cells from each other. At the same time they are dissolving the incrusting lignin of the secondary membranes of the wall, and there is finally left only a thin cellulose membrane bearing the ash constituents.[2] Other fungi, as *Polyporus borealis*, which I find

[1] See Galloway: "Notes on the Fungus causing Damping-off." Trans. Mass. Hort. Soc., Part I., 1891, p. 230.

Atkinson: "Damping-off." Cornell Univ. Agr. Exp. Sta. Bulletin, No. 94, 1895.

[2] R. Hartig: "Diseases of Trees." Eng. trans., p. 52.

occasionally on spruce trees in the Green Mountains, are stated by Hartig to exert a more selective action on cellulose.

I have called your attention to these details of the work of a few parasites partly that you may understand why it is that a given species is restricted to so few hosts. Each would-be parasite may be regarded as representing a definite number of capabilities. There are but few higher plants exactly suited to its needs. With resistance to be constantly overcome an unfavorable environment is a fatal handicap.

The effects of the fungous hyphæ on the cell walls of the host indicate solutional work as the explanation of the phenomenon of penetration and destruction of the cell wall. The hyphæ secrete substances, called ferments, capable of dissolving lignin and cellulose of the walls. When the tip of a hypha or haustorium is applied to a wall the portion in the way is dissolved before it, if the living cell cannot counteract or dispose of the ferment. There must be differences in the ferments secreted by different fungi, as has been pointed out by Hartig in a case of starch preservation.[1] A piece of oak wood was infested with *Polyporus dryadeus* and *P. igniarius* simultaneously. In the region of the wood where the unlike kinds of mycelia met, the starch was well preserved in the cells, while in other parts of the wood occupied by either fungus alone it was wholly destroyed.

In many cases cells of the host are killed by mere contact of a hypha without penetration. Some fluid poison from the fungus must have soaked through the wall of the cell, through the resisting protoplasmic lining of the cell, and exerted its deadly effect on the protoplasm. Oxalic acid in the form of free acid is produced by many fungi. This acid is very poisonous to living protoplasm. It has been suggested that fungi may kill the cells of the host by flooding them with oxalic acid, perhaps aided by a ferment.[2]

Internal Resistance to the Fungus. — Successful resistance to fungous invasion by cells in the interior of the plant seems to depend on vital processes of these cells when in normal health and full activity. We know how subject to rot fully ripe fruits are, as for example the apples now stored in cellars. Yet they cannot

[1] R. Hartig: "Zersetzungserscheinungen," 1878.

[2] Ward: "Croonian Lecture on Relations between Host and Parasite," Proc. of Roy. Soc. 47: 428, 1890.

rot except as the result of fungous attack, and observations on their infection by the fungi concerned in their decay (*Penicillium glaucum*, *Trichothecium roseum*, etc.) have led to the conclusion that fungi develop more easily the nearer the vital powers of the parts attacked are to their lower limit.[1] The same thing has been found to be true for the vegetative organs of several species of succulent plants which have been studied, and Tubeuf adds that fungi can frequently penetrate withering plant organs, while they could not infect the fresh living tissue.[2]

De Bary made an interesting experiment showing that the entrance of a hypha into a cell is dependent on the condition of the protoplasm: A mature firm shoot of a Petunia was infected with the mycelium (of *Botrytis cinerea*) and the hyphæ penetrated into the cortex about 1 cm., and then grew no further; evidently because the cell walls were thick, and their protoplasm disposed of the poisonous zymase (ferment) as fast as it reached them. When the infection was made on slightly etiolated, rapidly growing shoots, however, the fungus entered at once, and destroyed the entire shoot offhand.[3]

Ward[4] has called attention to the fact that wet murky weather, with frequent showers and a nearly saturated atmosphere, especially if the nights are cool, interferes with the normal physiological processes of plants and lessens their capability to resist fungous attack. The transpiration stream is checked by the already saturated condition of the atmosphere, yet absorption by the root continues. The cell walls become suffused with water and organic acids. In such weather the plants are, physiologically, in the condition of somewhat etiolated shoots with lowered vitality, and their cells offer less than their usual resistance to the fungus. They already contain an abnormal amount of acid — more than they can dispose of — and are unable to use up the additional amount with which the fungus floods them. Therefore the fungus prevails.

It is a matter of experience that the weather conditions just described usually result in an epidemic of fungous disease. Enough fungi and spores to start an epidemic are usually about in summer. I have already pointed out how such weather favors

[1] De Bary: "Morph. and Biol. of the Fungi." Eng. trans., p. 380.
[2] Tubeuf and Smith: "Diseases of Plants," p. 58, 1897.
[3] Quoted from Ward's "Croonian Lecture," p. 430.
[4] "Croonian Lecture," p. 430.

the fungus spores in their germination and in their penetration of the epidermis. If such weather also lowers the vitality of the host plant below the point of successful internal resistance, we can see why the disease is able to spread rapidly over entire fields and whole States as an epidemic.

A fungus may be well lodged in the tissues of a host and yet receive such effective resistance as to be able to make headway only when the vital processes of the host are dormant. This is well shown in the contest between the European Larch and *Peziza Willkommii*, a wound parasite which spreads in the bast and wood of the larch about the point of infection, killing the affected portions and producing a canker. During the season of active growth of the larch, the fungus makes no headway and is, in fact, shut off from the living tissue of the host by the formation of a layer of cork. During the autumn and winter, with the cessation of growth of the larch, the fungus breaks through the cork barrier and advances further into the living tissues of the host. As soon as the canker spot makes its way completely around the trunk, death of all parts higher up results. Hartig has studied cases which afford evidence of such a contest having been waged for a hundred years.[1]

Many other examples might be given, but those cited show that the protoplasm of living cells in the deeper tissues of the plant has an important part in the resistance to fungus infection, and that their maximum resistance is offered when they are in good health and full activity.

Resistant Varieties. — Observation tends more and more to show that some varieties of a species, and some species, are more resistant to fungi than other varieties and species perhaps closely related. In the past the originators and introducers of new varieties of cultivated plants have fixed their attention too exclusively on productiveness, marketable character, flavor, color, beauty, etc. Horticulturists will eventually recognize that ability to resist parasitic fungi is also a very desirable character in a variety, and varieties having the qualities which we now prize so highly will then be developed from more resistant species and races. From this point of view, the Japanese Plums, with their greater freedom from black knot than our varieties of *Prunus domestica*, are well worthy of the consideration they are

[1] "Diseases of Trees." Eng. trans., p. 120.

receiving. By patient hybridizing experiments Europeans have obtained vines with roots capable of resisting phylloxera, with foliage proof against the downy mildew, and with fruit giving the esteemed flavors to old and well-known European wines.

Eriksson's researches on grain rusts have shown that there are some varieties of wheat able to resist the more frequent forms of rust, and in no way endangered by them. By the same method varieties adapted for the rust-infested districts of Australia have also been obtained.[1] Such results show what may be accomplished.

Transmission of Fungous Disease to Offspring. — We have hitherto been taught by writers on plant diseases that diseases of plants are not transmitted to the offspring. Hartig states that[2] "A transmission, by inheritance, of diseases to descendants is unknown in the vegetable kingdom. One may without hesitation make use of the seeds of plants suffering from any conceivable disease for the propagation of new plants." Eriksson's recently published researches into grain rust[3] are opposed to this conclusion. He found that outbreaks of rust occur in grain fields in a way quite inexplicable by our former knowledge of rust, and he was led to suspect that the seed might have been infected by the parent. For the last four years he has therefore been growing plants in sterilized earth in glass houses specially constructed to keep out the spores of the disease which may be floating in the air. He reaches the general conclusions:

A. The outbreak of grain rust is due (a) in the first place to germs of disease in the host plant itself, which in certain cases are inherited from the parent plant through the seed, and in which they lead a latent symbiotic life as a mycoplasma and continue to do so afterwards for a long time in the resulting plant, and (b) in the second place to external infection from the vicinity.

B. The intensity of grain rust is due (a) in the first place to the degree with which the dominant outer circumstances (weather, soil, manuring, and so forth) are able to convert the inner germs of disease from the latent stage of a mycoplasma into a visible stage of mycelium, and (b) in the second place to the accession of infective material from without.

These conclusions have been so recently announced that I am

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[1] Tubeuf and Smith: "Diseases of Plants," p. 82.

[2] "Diseases of Trees." Eng. trans., p. 16.

[3] "Swedish Researches into Grain Rust," "Bot. Gaz." **25**: 37, 1898.

unable yet to realize their full magnitude. That one kind of protoplasm may live in such close association with another kind as to be indistinguishable from the second kind, and then later on assume an independent existence, has not been suggested heretofore. If no mistake has been made these conclusions must lead to still greater advances in the knowledge of plants, and especially of the relations of parasitic fungi to higher plants. Eriksson points out "that they provide a new explanation for the varying susceptibility of different varieties of cereals, and also that we are warranted in suggesting that the predisposition of Hosford wheat to yellow rust may be explained by assuming that between this variety of wheat and the yellow rust an extremely vital mycoplasma-symbiosis is to be found, while, on the contrary, the Squarehead wheat is nearly exempt from the rust for the reason that no such symbiosis has arisen between this wheat and the fungus." They certainly indicate that seeds from plants affected with rust should not be used for propagation.

Discussion.

Benjamin P. Ware said that he and other farmers are interested particularly in club-footed cabbage. The lecturer had told us that spores may remain several years in the ground, and that they are particularly liable to attack one variety. He knew of a farm where there was a luxuriant growth of mustard sixty years ago. It would seem impossible to raise cabbages there if fungus was present, but it was not. Cabbage club foot must be new. It is a modern introduction. It is said that every variety of vegetable is subject to thirty different diseases.

Professor Burt replied that club root is an old disease, having been known more than one hundred years. Old Scottish records describe the disease. The original home of the disease is not known; it is distributed all over the world. The field of charlock may not have had the disease introduced there. A valley near Mount Mansfield, Vt., was so infected that the cabbage could not be grown there. On looking into its introduction there it was found that some one near Boston had sent infected plants there. The gardens are now full of it. The presence of the disease in cruciferous weeds carries the disease over from year to year.

Thomas Harrison asked whether the continuous cultivation of the soil with a cabbage crop is productive of the fungous disease.

Professor Burt said that it tends to perpetuate the fungus. The accumulation of the spores causes serious trouble in following years. There is no time to give the spores a chance to die out.

Mr. Harrison noted that the rotation of crops was recommended, and asked if the crops destroy the fungi.

Professor Burt replied that a fungus is liable to find only a few kinds of plants on which it lives. If a long rotation is practised and no cruciferous crop grown for several years the ground becomes free from the spores of the club-root fungus. The spores germinate and are destroyed. The crops of rotation must be such as will starve the fungus. With the cabbage a rotation of beet and turnip would continue the disease.

Mr. Harrison asked why there is no club root in certain parts of New Jersey.

Professor Burt said that limestone soils are found to give exemption from the disease. The same is found on Long Island, where oyster shells are used.

Samuel Hartwell said that manure will produce the disease, and that he should think that air-slaked lime would help, and asked whether we could thus plant cabbages with success.

Professor Burt said that lime kills the fungi in the ground, and is a fungicide for spores.

Mr. Harrison said that the wallflower is subject to club root.

Professor Burt replied that it is closely related to the cabbage.

On motion of William C. Strong, a vote of thanks to the speaker was unanimously passed.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 26, 1898.

A meeting for Lecture and Discussion was holden at eleven o'clock today, the President, FRANCIS H. APPLETON, in the chair.

The following lecture, which was illustrated with many lantern slides, was given:

SOME NATIVE FERNS OF NEW ENGLAND.

By HENRY L. CLAPP, Roxbury.

Many a person has a pleasant circle of friends living in different places and under different conditions: some in cities, others in

the country; some in highlands on aristocratic streets, others in lowlands on plebeian roads; but as he takes up his collection of photographs of these friends, and looks at each one in turn, what pictures with all their natural colors and movements flash upon the screen of memory! Dress, manner, distinguishing characteristics, and the individuality, atmosphere, and environment of each home come thronging upon his mental vitascope. It may be winter, and summer vacation scenes come almost unbidden; or it may be summer, and visions of autumn rambles and winter studies come back to him. These beautiful, instructive, it may be laborious experiences are the best part of life; they bridge over the rough and sad places; they kindle the imagination in anticipation of happier and more useful seasons in the future.

The fern gatherer also has his circle of friends in Nature's devious ways, and like his human friends these silent acquaintances have their family and given names, their selected places of abode, their distinctive dress and habits, their inherited traits, and their destiny to fulfil. It may be that they are to be buried, as in ages past, to be exhumed in the form of coal to minister to the comfort of man's body as they now minister to the happiness of his mind. As a part of his herbarium they may serve every winter to call up a delightful panorama of mountains and meadows, fields and woods, with all the color and movement of human life associated with it. It may be that as we look at their photographic representations today we shall be carried back in memory to delightful rambles and absorbing studies. But beyond that is the hope that some listener, some looker-on, may be moved to seek acquaintance with those graceful plant forms which we call ferns, and thereby experience a measure of that quiet happiness which such men as Gray, Eaton, Davenport, and Underwood have known.

Scope of this Hour's Work. — This illustrated talk is intended especially to help those who have made some progress in the study of our common native ferns. Necessarily the ground covered will be entirely familiar to those who have studied ferns to a considerable extent. Such must not expect to hear anything new. However, the hundred and thirty slides to be shown will be new, and, it is hoped, interesting and instructive. Without attempting to cover the whole field of our common ferns, or giving a complete botanical description of a single species, we can consider

some of their most prominent characteristics and the most interesting phases in their life history. Only such marked characteristics will be mentioned as would be noticed by one well acquainted with ferns in their homes. Minor details can be found in any good book on systematic botany.

A Few Technical Terms. — We cannot talk about ferns with profit unless we use the appropriate language, including those precise and expressive words which are called technical. But words alone, without antecedent experience on the part of the hearer, convey no meaning, call up no pictures, and make no impression. Names are best explained by the real objects to which the names belong; wanting the real things, their photographic representations, especially those on a large scale, will serve to make clear the meaning of terms.

That part of a fern which is above ground, including the green leaf-like blade and its stem, is called a *frond;* the stem in fern language is called the *stipe;* and its continuation through the flat green blade is the *rachis.* The separate leaf-like parts extending right and left from the rachis are *pinnæ*, the plural of the Latin word *pinna*, meaning a *feather.*

Many pinnæ and some fronds resemble a loose sort of feather. If the pinnæ are divided into separate divisions, as in the case of the Spiny Shield-fern, *Aspidium spinulosum*, such divisions are called *pinnules* (little feathers). If the frond has no pinnæ, but is shaped like a plantain leaf, for example, it is *entire;* if it has pinnæ that are not cut into separate divisions the frond is *once pinnate;* if the pinnæ are cut into separate divisions it is *bi-pinnate;* if the pinnules are similarly cut it is *thrice pinnate.*

Sori, or Fruit Dots. — On the under side of many common fern fronds there are fruit dots or *sori*, as they are technically called. They consist of bunches of spore cases, or *sporangia.* Sometimes they have coverings called *indusia*, which are of many different shapes. A single *sporangium* contains innumerable minute dust-like bodies called *spores*, which under favorable conditions develop into minute vegetable forms called *prothalli.* A cross-section of a sorus illustrated on a large scale will indicate the relative positions of the spores, sporangia, and indusium, which make up a *sorus.*

The Great Aspidium Family. — Members of the Aspidium family have been taken to illustrate the characteristic and minute parts of ferns, because they are so common that in almost any open un-

cultivated place one may find specimens enough for the identification of the family. In this family the indusium is shaped like a circular shield, for which the Greek word is *aspidion*. This word gives the family name, *Aspidium*. The given or specific names like *spinulosum* (full of spines), *cristatum* (crested), *marginale* (marginal), and many others, are still more significant, as John Smith is more significant than Smith alone. This Aspidium family, then, is distinguished by circular badges, family buttons, or coats of arms, as they might be called.

The Sword Fern. — A little difference in the shape of the indusium is the reason for the name of another family, that of the Sword Fern, the commonest fern of the household. The botanical name, *Nephrolepis exaltata*, is very significant. *Nephros* means *kidney*, and *lepis*, *scale*. The indusium is a kidney-shaped scale. The frond is upright and exalted; hence the name *exaltata*. The drooping habit, which the florists in and around Boston have had so much to do in forming, has led Mr. Davenport to give to the fern of that form the additional name, var. *Bostoniensis*.

Life History of Ferns. — With these brief references to the essential parts of ferns and the significance of their names we are in a measure ready to consider their life history, which in its early part is especially interesting, because it is so different from that of flowering plants, such as the corn, the bean, and the rose.

For instance, in the reproduction of a bean plant from a bean the process is direct; that is, what we call a bean is a complete embryo plant wrapped up with its earliest food in a covering, and under the combined influences of heat, light, and moisture it simply unfolds; there is one development, one step. On the contrary, a fern spore, which is often improperly called a seed, does not produce a young fern directly, but first gives rise to an intermediate form called a *prothallus*, a minute, heart-shaped, leaf-like body that has male organs called *antheridia* on the lower part underneath, and female organs called *archegonia* on the upper part near the sinus. The young fern is a product of this prothallus, and an indirect product of the spore. There are two steps in the process — two developments: first, the prothallus from the spore, and then the true fern from the prothallus. Certainly ferns are appropriately called cryptogamous plants, on account of this obscure mode of reproduction.

There are ferns whose sori, so far as form goes, might easily be

taken for flowers. Take, for example, the sori of *Schizocœna Brunonis*, a fern native to the East Indies. The indusium is divided into six petaloid forms, which come from under the sporangia instead of covering them from above, as indusia commonly do. The sporangia resemble the achenia, or seed-vessels, of some members of the Crowfoot family. Indeed, so far as the form is concerned, these sori might be taken for small buttercups, the divisions of the indusia representing sepals and the sporangia, achenia.

Distribution of Spores. — Let us consider the curious means by which spores find themselves in favorable conditions for the production of prothalli — how they escape from the spore cases and reach the earth where their work is to be started.

The sporangia, or spore cases, of the Christmas Fern, *Aspidium acrostichoides*, under favorable conditions will illustrate how spores are thrown from the cases. One important part of the sporangium consists in the annulus, or ring, on the outside. In drying, this ring contracts, ruptures the fragile walls of the sporangium straight across, and bends backward, sometimes so far that one end of the ring meets the other end, carrying the spores on the ruptured walls backward at the same time. Then it suddenly springs violently forward, throwing the spores away, and returns to its former position. If the ring is wet and dried a number of times the action is repeated as often, so that between sunshine and showers the spores are pretty effectually scattered, and the ring is worn out with hard work.

I took an Aspidium frond from the press in a warm summer evening and placed it on the table near a study lamp to examine the sori. I had scarcely adjusted the magnifying glass when I saw a violent commotion among the sporangia. They curled, twisted, snapped, and seemed to be batting each other vigorously. The moisture in them had not been entirely dried out while they lay in the press; but the heat of the lamp combined with the warm atmosphere of the room quickly dissipated moisture enough to produce the actions mentioned. A teacher who was inclined to doubt my statement of what I saw, afterward observed similar motions while holding fruit dots in her hand. Professor Atkinson, of Cornell University, by moistening sporangia with water and drying them over an alcohol flame, caused violent action to take place in sporangia from eighteen to twenty years old.

The spores of the Flowering Fern, *Osmunda regalis*, are dispersed by the springing of the two parts of the sporangium, the spores being thrown in two directions. Among flowering plants a great many similar springing contrivances have been observed. Examples of such are seen in jewel-weed, witch-hazel, violet, cranes-bill, storks-bill, wood sorrel, and other plants.

Crosiers. — One who can name plants only when they are in blossom is not much of a botanist; but if he has studied plants in their homes and can name them as soon as they appear above ground in spring, and can distinguish them by their leaves merely, he can claim to know them well. So one who has studied ferns in their homes from the start can distinguish genera and species by the crosiers as soon as they rise from the ground in spring. The *crosier* is a young fern frond rolled up as a strip of carpet is. It takes its name from its resemblance, when partly unrolled, to a bishop's staff, which is sometimes called a crosier. Its head is curved in the form of a shepherd's crook. The fern crosier in spring simply unrolls and grows in every part at the same time, developing somewhat like a bud and somewhat like a bean plant from a bean.

Many buds, as those of the horse-chestnut and the poplar, for example, have the tender parts protected by a substance resembling fur. In a similar manner the young and tender crosiers of some ferns are protected, some by wool and some by chaffy scales, usually of a brown color. Crosiers, like buds, are made up in the fall, and in early spring may be found grouped in a circular form called a *crown*. The crown of *Aspidium marginale* is usually very conspicuous, and is covered with dark brown scales. The Christmas Fern has a white satiny fur; the Cinnamon Fern, *Osmunda cinnamomea*, a brownish wool; Clayton's Fern, *Osmunda Claytoniana*, a white wool. The Royal Fern, *Osmunda regalis*, also has crosiers protected by white wool, but its slender lake-red stems or stipes serve to distinguish it from any other common fern in this region at an early stage of growth.

The crosiers of many ferns do not have the means of protection referred to, as in the case of the Lady Fern, for example. The coiled-up form seems to serve the purpose of protection sufficiently well.

To the unobservant or uninterested person crosiers look very

much alike, but the more one studies them in their homes the more obvious their differences become.

Dissimilarity of Fronds.—To carry on the life history of ferns farther, another step must be taken, and that is the development of crosiers into fronds. Fronds especially show very marked differences, although they too have been declared to "look all alike." We will now compare a few fronds unlike in shape.

Clayton's Fern, *Osmunda Claytoniana*, bears but little resemblance to the Royal Fern, *Osmunda regalis*. Its fruit is on pinnæ, from two to five pairs, midway of the frond; and, since these fertile pinnæ make a break in the sterile pinnæ, the fern is sometimes called the Interrupted Fern. The foliate parts of the Royal Fern resemble the leaves of a shrub more than those of any other fern in this region. The fruit is on long stems branching out at the top of the frond.

The Christmas Fern, *Aspidium acrostichoides*, is sword-shaped in outline. It has pinnæ, but no pinnules, and the sori are on the upper pinnæ, which are narrower than the sterile pinnæ. The Oak Fern, *Phegopteris Dryopteris*, is ternate, or in three well-defined parts, each part being more or less triangular in form. The Beech Fern, *Phegopteris polypodioides*, has the form of an arrowhead, and the two lower pinnæ are deflexed or bent downward and forward. The Maiden-hair Fern, *Adiantum pedatum*, bends around somewhat in the form of a horse-shoe. Surely these fronds do not resemble one another. There are some that do, which will be mentioned later, when one more stage in their life history has been noticed.

Basis of Classification. — Notwithstanding the great diversity of forms in fern fronds, the basis of classification is generally found in the composition, position, shape, and size of the sori. The mode of veining and the rootstalk are also important. The principal forms of sori are circular, stitch-shaped, straight and curved, cup-shaped, globular, and marginal — the last when the edge of some part of the frond is turned over so as to make a sort of hem for the protection of the spore cases. A comparison of the sori on the pinnæ of several species of our native ferns will illustrate the importance of sori as a basis of classification. Take, for illustration, a pinna each of *Aspidium marginale*, *Asplenium thelypteroides*, and *Dicksonia pilosiuscula*. The first has elevated sori, with shield-shaped indusia on the margin of the lobes of the pinna;

the second has straight stitch-shaped sori at an angle with the midrib of the lobe; and the third has cup-shaped sori in the sinuses of the pinnules. Each of these species is put in a different genus from the others by reason of the differences in their sori.

Members of the Aspidium Family. — Keeping in mind that the Aspidium family is distinguished by indusia resembling circular badges or shields, we will notice the main characteristics of the species common in this region.

First in frequency comes the Mountain Fern, *Aspidium Noveboracense*. The fronds taper both ways from the upper middle part, the lower pinnæ gradually growing farther apart and smaller. This is so marked a characteristic that to distinguish the fern no other is really necessary. No other common fern has this characteristic. The sori are minute, and unless they are in just the right stage of development the glandular indusia are hard to make out. This fern grows on rocky, wooded hillsides and mountains. In color it is light yellowish-green — so light as to take almost white with the ordinary photographic plate, with which both yellow and green commonly take black. When the sunbeams come through the openings in the foliage of the trees and strike on these light-reflecting fronds the effect is unusually brilliant. They are delicate in structure and tender in constitution, passing away at the first approach of cold weather.

The Meadow Fern, *Aspidium Thelypteris*, is very common in moist woods and low land bordering on woods. The pinnæ commonly make a right angle with the rachis, and the lowest are but little smaller than the largest on the frond, and, therefore, it need not be mistaken for the Mountain Fern just described. The fertile frond looks quite different from the sterile frond. The margins of the lobes are strongly revolute, or rolled over so much as to make the lobes look narrow and acute. This contraction of lobes or pinnæ in fertile fronds is found in other species to be noticed later. If the frond is taken at the right season the circular indusia and the beginning of the curvature in the margins of the lobes may be seen plainly.

A very interesting fern, called by Mr. Davenport *Aspidium simulatum*, shows resemblances to both the Mountain Fern and the Meadow Fern. It has the shape of the Meadow Fern, but its sori are larger and its indusia are glandular, while the indusia of the Meadow Fern are not glandular. It is like the Mountain

Fern in respect to the glandular indusia and pubescent midribs, but is distinguished from it by its larger sori and Thelypteris-like fronds. Mr. Davenport says that it is somewhat later than its congeners, and prefers cool, swampy woodlands, and that he has called it *simulatum*, "on account of its remarkable simulation of a narrow woodland form of *Asplenium Filix-fœmina*, which almost invariably has conduplicate pinnæ when growing in the sun."

The Spiny Shield Fern, *Aspidium spinulosum*, takes its specific name from the sharp points or spines ending the numerous lobes of the pinnules. *Spinulosum* (full of spines) is, therefore, a very significant name. The pinnæ are commonly set on the rachis at an angle varying from forty-five degrees to sixty degrees, the lower ones being broadly triangular in shape. The basal pinnules on the lowest pair of pinnæ are the longest, and they suggest bow-knots with the ends slanting downward. This prominent characteristic will nearly always be sufficient for the identification of the fern. The pinnules are set obliquely on the midrib, and the indusia have no glands. The frond is oftenest twice pinnate, commonly light yellowish-green, somewhat coarse in texture, and deeply veined on the upper side. It is an evergreen, and grows in partly shaded places near rocks.

This type form of *spinulosum* has been described somewhat carefully for the reason that it is likely at first to be confounded with its more common variety, *Aspidium spinulosum* var. *intermedium*. Nevertheless they are unlike in almost every feature that has been mentioned. To be sure, the lobes of the pinnules of the variety *intermedium* have spines, and the outline is somewhat like that of the type. There the resemblance ends. The pinnæ are set on the rachis at an angle varying from sixty degrees at the top of the blade to ninety degrees at the bottom. The largest pinnules on the lowest pair of pinnæ are not the basal ones, but next to them, and there is no suggestion of a bowknot. The pinnules are nearly at right angles with the midrib, and the indusia have glands, which can be seen best just before the indusia begin to shrivel. Indeed, the indusia pass away so soon that the sori appear naked. The frond is oftenest thrice pinnate, very dark green, fine and lace-like in texture, and loves the deepest shade. Seldom have I found it outside of dense, dark woods. When this description is compared with that of the typical *spinulosum* not much resemblance will be seen.

The next variety of *Aspidium spinulosum* is *dilatatum*, easily distinguished by its great breadth and thrice-pinnate divisions; that is, the pinnules are divided to the midrib. The type form is only twice pinnate.

The Crested Shield Fern, *Aspidium cristatum*, is one of the most beautiful of our native ferns. The frond is linear-oblong or lanceolate in outline and twice pinnate; the pinnæ are short, thick, and triangular, and the flat sori are larger than those of any other member of the family in our region. This fern is an evergreen, not very common, and bears transplanting well.

Aspidium Boottii, though now recognized as a distinct species, was formerly considered a cross between *A. cristatum* and *A. spinulosum* var. *intermedium*. It resembles *A. cristatum* in its general shape, erect habit of growth, and triangular lower pinnæ. It is like var. *intermedium* in regard to its thrice-pinnate divisions, thin texture, glandular indusia, dark green color, and spinulose-toothed pinnules set on the midrib nearly at right angles with it. It is much taller than either *cristatum* or *intermedium*. The fact that the spores are sterile is strong evidence of its being a cross. It is a rare fern, probably on account of its sterility.

Aspidium marginale is one of our most attractive evergreen ferns. The frond is graceful, but firm in texture; the upper surface is noticeably bluish-green, and the under surface very gray. The pinnæ taper to long points and curve upward, and the pinnules bear on their margins elevated sori resembling apple tarts. Indeed, they are so high that when placed in the sun they cast long shadows on the pinnules. The shield-shaped sori being situated on the margins of the pinnules, the name *Aspidium marginale* is most appropriate. Its thick, leathery texture qualifies it for an evergreen, and this, added to the fact that it is easy to raise, makes it a fern of the first quality for the fernery. It has been growing vigorously for seven years in the George Putnam School Garden. The chaffy brown scales that cover the undeveloped crosiers in early spring persist on the stipes when the fronds are fully developed.

A fern that partakes of the characteristics of both *Aspidium cristatum* and *Aspidium marginale* was discovered in 1880 by Raynal Dodge, of Newburyport. Mr. Davenport has raised and studied it for three or four years, and with the best of reasons has declared it to be a cross between the species named above. The upper part of the frond is exactly like that of *A. marginale*, while

the lower part is like that of *A. cristatum.* Moreover, the root-stock is erect like that of *A. marginale*, while the texture and venation are like those of *A. cristatum.* Again, the crosiers being thickly covered with light brown scales, and the indusia being convex, it is like *A. marginale.*

If so well-marked a species can be found in a region supposed to be thoroughly searched, other hybrids, varieties, or even species, may be discovered by some diligent observer.

The native evergreen fern that holds the first place is the Christmas Fern, *Aspidium acrostichoides.* It is sword-shaped in outline, thick and leathery in texture, glossy dark green in color, and produces its sori on the contracted upper pinnæ, though the tips of the lower pinnæ sometimes have sori. The pinnæ are generally entire, slightly toothed and scythe-shaped, and at the base on the upper side have a decided heel; but in the variety *incisum* the pinnæ are cut into pointed lobes. This variety seems to be permanent, since one in the George Putnam School fernery has shown the characteristic marks for four or five years without intermission. The Christmas Fern grows in well-shaded places, and when the fronds come up through the snow in the woods the glossy, dark green clumps are in striking contrast with the white snow. In Canada especially it often grows in immense clumps. The crosiers are covered with a silky white glistening coat, and are the most fantastic, not to say decorative, looking crosiers that I have seen.

The Asplenium Family. — Next in importance to the Aspidium family is the Asplenium family, and the member seen most frequently is the Lady Fern, *A. Filix-fœmina.* One can hardly say where it does not grow, it is so common. It may be distinguished easily by its fruit dots, which sometimes are straight and sometimes curved like a horse-shoe, and soon run together, forming dense dusty brown patches on the under side of the pinnules. The frond when growing in the shade is ovate lanceolate, but in places exposed to the sun it changes its form so much as to appear to be a different species. In the latter case the pinnæ curve upward in a vertical direction, and the pinnules stand back to back as if to repel all hostile forces in the form of wind, cold, rain, and the heat of the sun. Professor D. C. Eaton called this form var. *angustum.*

The fern puts itself in this attitude to protect itself from the

too intense rays of the sun, which cause too rapid transpiration of moisture from the foliage. It often grows by the side of roads on dry gravelly banks where there is but little moisture, and if by reason of a hot sun there is too rapid transpiration of moisture from the foliage the roots cannot take up enough to supply its place, and the frond wilts and perhaps dies. Other ferns have the habit of drawing their parts together for protective purposes, as, for example, the Flowering Ferns, which will be considered later.

The most striking illustrations of this habit of taking a protective position are found in the so-called Compass Plants, *Lactuca Scariola*, which grows in Europe, and *Silphium laciniatum*, a Western plant. Their broad surfaces face the east and west points, while the edges of the leaves extend north and south. So constant is this habit that in former years hunters and travellers were accustomed to be guided by the position of the Silphium leaves in their wanderings over the trackless prairies.

Probably there are more varieties of the Lady Fern than of any other fern on the earth. Many of them have been found growing wild, but by far the larger number have been produced by sowing varieties of spores together. In England, Lowe, Moore, and Clapham, especially, have spent a large part of their lives in producing such varieties. Mr. Lowe, during a period of fifty years, has produced at least four hundred varieties of the Lady Fern, some of which are very remarkable. By looking at the type form again we can better appreciate the remarkable changes in form to be seen in the varieties. The variety *corymbiferum* presents an extraordinary example of pinnæ forking at the ends again and again, until the end of every pinna becomes fan-shaped or takes the form of a corymb, whence the name *corymbiferum* (bearing corymbs). This variety was found growing wild on the Island of Guernsey, one of the Channel Islands. The variety *acrocladon*, found growing wild near Howard Castle, England, by Mr. Clapham, shows still more remarkable variations from the type form. It takes an arborescent form and resembles an elm tree flattened out. The subdivision of the rachis so as to simulate the branching of a tree is unique.

The variety *Fama* was originated by Mr. Lowe. It is quite remarkable for the bifurcation of the rachis and of each pinna. The pinnæ are widely separated and the pinnules are much contracted.

Hebe, another variety originated by Mr. Lowe, shows a stronger tendency to bifurcate, especially at the top and on the lower pinnæ, which are noticeably lax. The bifurcation is repeated, until each of the lower pinnæ terminates in a crest. *Multifidum*, originated by Mr. Lowe, has the pinnæ the usual distance apart, but they are very delicate in form and end in many divisions, whence the name *multifidum* (divided many times). The pinnules are extremely regular in arrangement, and gradually diminish in size to the ends of the pinnæ.

I have noticed some remarkable variations in the fronds of the Lady Fern, besides those in the case of fronds growing in exposed places already referred to. There are various degrees of thickening of the frond at the top and of rolling up so as to form a somewhat compact ball of stunted and misshapen pinnæ and pinnules. So many similar forms in other plants are caused by grubs that these fern balls would seem to be caused in a similar manner, but an examination of many specimens has never been rewarded with the discovery of a single grub. The disposition to thicken and bifurcate at the top in case of perfectly erect fronds, then to bend a little in the case of one frond, and more and more in the case of others, seems to show *the nature of the fern* rather than the presence of grubs.

The crosiers of the Lady Fern are scrawny looking things without wool or scales. The stems are commonly blackish-brown, but often lake-red in color, like those of the Royal Fern, but the absence of wool serves to distinguish them.

Asplenium thelypteroides is not a very common fern, but has interesting characteristics. The pinnæ are remarkably acuminate, or long taper pointed. The sori are stitch-shaped and straight. The indusia at a certain stage of growth resemble light blue silk stitches, and, once seen in their most beautiful condition, will make a lasting impression on the memory of the observer. So far as the sori are concerned this fern is one of our best types of the Asplenium family. It flourishes well under cultivation, and needs but little care.

Flowering Ferns. — The Osmundas are called Flowering Ferns because the fruit appears in the same relative position to the frond in which the flowers and fruit of phænogamous plants appear to their respective plants. Flowering plants usually have their flowers at the top of the leafy stem, like the rose bush, or on a stalk separate from the leaves, like the dandelion.

The Royal Fern, *Osmunda regalis*, has its fruit, which looks like a cluster of flowers, on the top of the leafy stem, which is much branched. The whole arrangement is like that of the pink spiræa cultivated in gardens. The foliage bears no resemblance to that of our common ferns, but is more like that of some flowering plant or tree, like the locust. The pinnules look like the leaves of some shrub. It grows to the height of five feet in this country, but in England, which has a moister climate, it reaches eleven feet, and on account of its height and beauty the name Royal Fern is well bestowed. In the shade the branches, both of foliage and fruit, spread or make wide angles with the rachis; but in exposed places the branches take a position nearly vertical, at the same time drawing pinnules and fruit clusters together. The crosiers are clothed with wool slightly varying from white, and the stems are of a beautiful lake-red color. If various crosiers covered with wool are seen growing together in spring in the same locality those with lake-red stems may be known as Royal Ferns in the process of developing.

Osmunda Claytoniana has the fertile pinnæ midway of the frond, and so is called the Interrupted Fern. The fertile pinnæ differ much in number and mode of fruiting. Sometimes there is only one pair, then one and a half, then two, and so on up to five pairs. The globose sporangia are arranged in circular uncovered bunches on the much contracted pinnules, which are occasionally flat, but commonly dense and cylindrical. This fern also has the habit of spreading its pinnæ when it grows in the shade, and elevating them so as to make a sharp angle with the rachis when growing in the sun. This illustrates another attempt to prevent too rapid transpiration of moisture from the foliage. Magnificent specimens of this fern grow in Hyde Park. It has been grown successfully in the George Putnam School Garden for six or seven years. The crosiers are clothed with nearly white wool, and are as beautiful as any growing in this region.

The blade is often light yellowish-green, especially when young, and droops gracefully, so that there is little need of confounding it with the third species of Osmunda, the Cinnamon Fern, *Osmunda cinnamomea*, which is stiff, erect, and dark green in color, and the pinnæ nearly always make a noticeable angle with the rachis, but in open places the angle is quite sharp. There is a little tuft of brown wool where the pinnæ join the rachis,

which serves to distinguish a frond of the Cinnamon Fern from one of the Interrupted Fern. The fertile fronds are much shorter than the sterile, and soon wither and fall down in a limp, straggling way. As a rule the fruit is on a stalk by itself, and clustered together in the form of a club; but I have found in the same clump many unsuccessful attempts to form fruit. The crosiers are covered with wool slightly cinnamon-colored, and so they are prepared to start from the ground in spring among the very foremost.

The Onocleas. — The Sensitive Fern, *Onoclea sensibilis*, is exceedingly common. Except on high land it grows wherever ferns grow — in woods, open fields, pastures, meadows, and along stone walls. It is not sensitive about the location of its home, provided it is not dry.

Ordinarily the fruit does not appear on a leaf-like form, but on a stalk by itself. It consists of small berry-like forms arranged on stiff, straight branches. These spheroidal forms contain the sporangia, or spore cases. The fertile frond is a much modified form of the broad, unfertile foliate frond. Sometimes the modification is only partly completed on either side of the rachis, and sometimes it is complete on one side and incomplete on the other. In a small area, perhaps thirty feet square, I have found a complete graded series of modifications, from the expanded sterile frond to the complete fertile frond. These imperfectly fruited fronds have been called variety *obtusilobata*, but, since they are very variable and uncertain to appear again in the same place, they do not deserve to be so classed. They are simply unstable variations, such as are seen in the growth of Clayton's Fern and the Cinnamon Fern; but they present a valuable lesson in morphology; they illustrate how seed vessels generally are formed from leaves.

The Sensitive Fern has a most ancient pedigree, having come down to our time, unchanged in form, from a period half a million years back. It is older than the Rocky Mountains or the Himalayas, and is supposed to have come into existence during the Chalk age, before mammals appeared on the earth. Sir William Dawson places it in a later period, the Eocene, and says it is found in great abundance in the Laramie beds in the West.

The Ostrich Fern, *Onoclea Struthiopteris*, is appropriately named, since both the fertile and sterile fronds resemble ostrich feathers. The sterile fronds taper downward in a marked manner,

like those of the Mountain Fern, but the frond is two or three times as large as that of the Mountain Fern, and the lower pinnæ are comparatively near together. The fertile fronds are much shorter than the sterile, and look like silk twist. They suggest a buttonhole, or a piece of embroidery worked with lustrous brown silk. The crosiers are without wool or scales and keep their rolled-up form until the lower pinnæ are well developed, and the frond has attained a considerable height.

This is the giant among our native ferns. In Canada I have found it growing seven feet high. It is entirely hardy and easy of cultivation. One planted in the fernery of the George Putnam School years ago has spread widely and given the pupils many opportunities to observe its development "from start to finish."

The Rock Fern. — The Common Polypody, *Polypodium vulgare*, is often called the Rock Fern, because it is nearly always found growing in a thin layer of loose leaf-mould on rocks. The layer may be two inches thick, and can be readily stripped from the rocks, bringing the fern with it. Planted in ordinary soil away from rocks it languishes and gradually dies out. The term "polypody" means many-footed, and refers to the numerous branches of the rootstock. A characteristic mark of a Polypodium is the absence of indusia in the sori. This characteristic of the Polypodys is well illustrated by *Polypodium aureum*, the Golden Polypody of Florida. This fern grows naturally on the cabbage palmetto, but it is a beautiful fern for house culture, as proved by Mrs. Richards, who has grown it for years. The large, naked sori are remarkable. Other ferns have sori without indusia, but their fronds have not the shape of Polypodium fronds.

Beech Ferns. — We have three species of *Phegopteris* whose sori have no indusia. The first is *Phegopteris polypodioides*, whose fronds are triangular in outline, or shaped like an arrowhead. The lowest pair of pinnæ are deflexed and stand forward. These marks will serve to distinguish the species from all others. The sori are small, naked, and situated near the margins of the lobes of the pinnæ. This fern grows in bushes and woods of various kinds, and in great profusion in Northern New England and Canada.

Phegopteris hexagonoptera is closely allied to the species just mentioned, but it is relatively much broader — in fact, broader than it is long. It is not one of the common ferns, nor is it especially rare; but it is common southward.

The Oak Fern, *Phegopteris Dryopteris*, has three well-marked divisions which are more or less triangular in shape. It is a small fern, averaging six or eight inches in height. There seems to be no special reason why it should be called the Oak Fern, since it commonly grows in any kind of woods, — pine, maple, and birch, as well as oak and beech.

The Maiden-hair Fern. — Although many species of Maiden-hair Fern are cultivated in this region, and many have been exhibited in Horticultural Hall at intervals for many years, there is only one native species growing in New England, and that is *Adiantum pedatum*, a very graceful and beautiful fern. It has not been my good fortune to see much of it in Massachusetts, but in the Province of Quebec I have seen it growing over large areas. It grows in moist woods, and has the peculiar property of repelling rain or moisture from its foliage, as the jewel-weed does; hence the name Adiantum, which means *unwetted*. The stipes are black and shining and the sori are marginal, the margins of the lobes being reflexed to form indusia. I have raised the fern in several places, but it does not flourish well for a number of years.

Bladder Ferns. — The Bladder Fern takes its name from the inflated indusia of the sori. There are two common species; but they are not as common about here as most of the ferns already mentioned. In the Province of Quebec they are found in luxuriant abundance. The narrow drooping fronds of *Cystopteris bulbifera*, the Bulb-bearing Bladder Fern, are often three feet long, although the length, as given by Gray and Underwood, is from one to two feet. This fern is peculiar from the fact that besides sori it bears small bulbs, about as large as a small pea, on the under side of the rachis. New ferns grow from these bulbs, thus simulating the one-step development of flowering plants. The little bulbs are ferns in embryo, and they fall to the ground and there take root in the same manner as the axillary bulbs of the tiger lily do.

The Fragile Bladder Fern, *Cystopteris fragilis*, is a small species, rarely exceeding eight inches in length. It commonly grows in densely shaded spots in the crevices of rocks. The fruit dots are small, and the bladder-shaped indusia are circular at one end and pointed at the other. It matures early, being out of good condition by August. I have raised it without difficulty five or six years, though it does not increase.

The Woodsia. — Another little fern which loves the crevices of rocks is *Woodsia Ilvensis.* It often grows in exposed places, but manages to keep comfortable by growing in dense clumps and covering itself with thick brown bristles. I have seen it growing in the greatest abundance in Canada, but it is also common in New England. The sori of Woodsia are generally peculiar from having the indusia in long ribbon-like strips coming from under the sporangia, instead of being over them, as is commonly the case.

The Walking-leaf Fern. — The *Camptosorus rhizophyllus*, or Walking-Leaf, according to Gray is found from west New England to Wisconsin and southward. I have found it abundant on lime rocks in the latitude of Quebec. The generic name *Camptosorus* means *bent sorus*, referring to the curved sori; the specific name, *rhizophyllus*, means *leaf-rooted.* The fronds have long tapering points which bend down to the earth and take root in the manner of a strawberry runner. The process is repeated, and thus the rooting leaves or fronds seem to walk over the ground, but at an exceedingly slow pace.

Dickson's Fern. — The last fern to be noticed is the very common *Dicksonia pilosiuscula*, named for James Dickson, an English fernologist. It is the most delicate and lace-like fern that we have. I used to confound it with the Lady Fern if I saw it at a distance, but one look at the sori, which are very small, cup-shaped, and situated in the sinuses of the pinnæ, served to distinguish it from the Lady Fern, which has conspicuous curved sori. There are many species of *Dicksonia* in other parts of the world, but we have only this one.

Fern Localities. — High Falls in the Province of Quebec is a place remarkable for ferns. Coming this way almost to the Vermont line, on the South-eastern Railway, we find the little village of Glen Sutton, or "The Glen" as it is commonly called by the people of the vicinity. It is situated in a beautiful valley surrounded by mountains, from whose sides run many small perennial streams which have cut deep channels for themselves in the rocky declivities. The sides of these channels are wonderfully rich in ferns of nearly every common species. It was here that Edson, one of the best artists in Montreal, used to come to paint. It is no discredit to the comfortable hotel or the boarders to state that board is two dollars and half a week. Still farther this way, just over the line, in New Hampshire, is Colebrook, whose mountains are wonderfully rich in ferns.

Another beautiful place abounding in ferns is Bridgton, Me., which is on a chain of beautiful lakes, one of which, Highland Lake, resembles Lake George. On the very edge of this lake are fine groves abounding in ferns. Within an area one hundred feet square were a dozen species growing luxuriantly. Going by the path through the opening on the other side into the field a few rods, I found the numerous variations of the Sensitive Fern. A little farther on by the side of the road the variations of the Lady Fern were gathered; and a little farther away on the other side of the same road the variations of the Cinnamon Fern grew.

Here the consideration of ferns today closes; but if any listener wishes to become acquainted with ferns to almost any extent he should become a member of the Massachusetts Horticultural Society. Here he will always find help from competent botanists, sumptuous books, and the fine collection of pressed ferns presented to the Society by Mr. Davenport.

BUSINESS MEETING.

SATURDAY, April 2, 1898.

A duly notified Stated Meeting was holden at eleven o'clock today, the President, FRANCIS H. APPLETON, in the chair.

The President submitted to the meeting the following amendment to the Constitution and By-Laws, which was read twice and by a majority vote ordered to be entered on the records for consideration at the Stated Meeting on the first Saturday in July:

SECTION XVII, A.

COMMITTEE ON FORESTRY AND ROADSIDE IMPROVEMENT.

A Committee on Forestry and Roadside Improvement, of five members, shall give special attention to the subject of the preservation and improvement of the woodlands of Massachusetts; shall lend its assistance, so far as possible, to securing the planting of trees, and the preservation of those already planted, upon the borders of the highways of the Commonwealth; shall secure, so far as shall seem to it expedient, the enforcement of the laws of the Commonwealth relative to forests and trees; shall, with the approval of the Society, petition the Legislature for such changes in and additions to the laws as shall make them more

efficient; shall submit to the Committee on Lectures and Publication plans for lectures, essays, and discussions on forestry subjects; and shall have authority, with the approval of the Executive Committee, to offer prizes for written contributions to forestry knowledge, not exceeding the amount which the Society may have placed at its disposal.

The President appointed as the Committee on School Gardens, School Herbariums, and Children's Herbariums the following-named members:

Henry L. Clapp, *Chairman.*

Mrs. H. L. T. Wolcott,	Mrs. P. D. Richards,
George E. Davenport,	William P. Rich,
Miss Katharine W. Huston,	W. E. C. Rich, *Secretary.*

The President announced that James H. Bowditch would be unable to serve on the Special Committee on Forestry, and that he had appointed J. Woodward Manning in his place.

William H. Spooner announced the decease of Hon. John Simpkins, and moved that a Committee be appointed by the Chair to prepare a memorial of him. The motion was carried, and the Chair appointed as that Committee Professor Charles S. Sargent, Ex-President William H. Spooner, and Professor Benjamin M. Watson.

Joseph H. Woodford made a similar motion in regard to Fearing Burr, who died on the fourth of October, 1897. This motion also was carried and the Chair appointed as the Committee George Lincoln, Edmund Hersey, and Starkes Whiton.

The Secretary announced the receipt of a letter from Mrs. Sophia E. Copeland, acknowledging the receipt of the memorial of her brother, Edward C. R. Walker, and expressing her appreciation of the sympathy of the Society.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were upon ballot duly elected:

George M. Morgan, of Boston,
George H. Sutherland, of Roslindale,
Harlan P. Kelsey, of Boston.

Adjourned to Saturday, May 7.

MEETING FOR LECTURE AND DISCUSSION.

THURSDAY, April 21, 1898.

A lecture was delivered this evening, in the Society's Hall, before the Massachusetts Horticultural Society and the Appalachian Mountain Club, FRANCIS H. APPLETON, President of the former Society, in the chair. President Appleton welcomed the Appalachian Club to the Hall, and introductory remarks were also made by Professor William H. Niles, President of the Appalachian Club.

The following is an abstract of the botanical part of the lecture:

THE WILD FLOWERS OF THE CANADIAN ROCKIES AMIDST THEIR NATIVE SURROUNDINGS.

By CORNELIUS VAN BRUNT, of New York.

A trip over the Canadian Pacific Railway, from Montreal to Vancouver, is one of the most delightful to be imagined; and the variety of the scenery and the beauty and novelty of the flora make one's enjoyment increase each day. Last year we took this trip, going in the early part of July and returning the first of September, that we might photograph the flowers then in bloom. East of Lake Superior the flora was mostly familiar to us. Farther west, on the prairies, the flowers were especially brilliant and beautiful.

Banff was our first stopping-place. After the beautiful mountain scenery the thing that most impresses the stranger is the abundance and brilliancy of the flowers and their habit of growing in large communities, as it were. A hill blue with bluebells, a swamp vivid scarlet with painted cup or brilliant magenta with fireweed, are the rule, not the exception. The most striking novelty about the Banff Hotel early in July is the *Zygadenus elegans*, of the lily family, a beautiful white flower growing in great abundance on swampy ground. A swamp near the hotel, which had, earlier in the season, been filled with lady's-slippers, habenarias, arethusas, and other orchids, now showed myriad specimens of *Tofieldia glutinosa*, the parnassia, senecio, campanula, castilleia, and potentilla. *Potentilla fruticosa* might at a first glance be mistaken for a wild yellow rose, so large are both the bush and the flowers. The wild rose of that locality — *Rosa*

acicularis var. *Bourgeauiana* — was about through its blooming season. It had covered large areas and must have been very beautiful. Blue clovers, instead of red, white, or yellow, were also a novelty to us. The color of one of these, *Astragalus adsurgens*, varied from bright blue to purple and violet, and was most effective. Other plants resembling blue clover were *Astragalus hypoglottis*, *Oxytropis viscida*, and, most beautiful of all, *O. splendens*, a superb rose-purple head and leaves resembling silvery colored velvet.

In July the Leguminosæ seemed the best represented family. There was the beautiful rose-purple of the *Vicia truncata*, which twines about everything, white and pink *Hedysarum boreale*, *Oxytropis Lambertii*, both white and pink, the graceful and very fragrant *Lathyrus ochroleucus*, with cream-colored flowers and trailing habit, and the brilliant magenta *Hedysarum Mackenzii* — these are a few members of the Pea family in bloom during July. *Phaca Americana* was in seed, but almost as handsome as when in flower. A superb blue vetch, which has not yet been identified, grew in masses on the shore at the junction of the Bow and Spray rivers. Under the coniferous trees near Banff the ground is fairly carpeted with *Linnæa borealis*. With it were the dwarf cornel, the one-flowered pyrola (*Moneses grandiflora*), and also *Pyrola secunda*, *P. chlorantha*, and *P. rotundifolia*. These grew in dry places, but in wet, shady spots the pink pyrola (*P. uliginosa*) was abundant. With it we found *Pinguicula vulgaris* and the delicate unobtrusive brown lily (*Stenanthium occidentale*), which has a delicious fragrance.

The Bow River Valley, through a glass, looked as yellow as gold, and we found that the hue was due to the abundance of *Gaillardia aristata*, which resembles our *Rudbeckia hirta*, though it is more brilliant.

A most noticeable shrub is *Shepherdia Canadensis*, with its vivid scarlet or translucent yellow berries. *Allium cernuum* and its more noticeable relative, *A. Sibiricum*, cover large patches of dry hillside. In shady, moist nooks *Parnassia palustris* had taken a strong foothold, and a little later in the season the more beautiful *P. fimbriata* appeared.

The season is so short in this latitude that haste is very necessary if the flowers would fulfil their mission in this world; and in consequence they bloom and fade away with the most con-

fusing rapidity. Spring flowers and summer flowers and autumn flowers all bloom together, and in such an energetic fashion that we marvel not only at their vigor, beauty, and abundance, but even more at the apparently intelligent comprehension of the necessity for speed. A showy weed is the strawberry blite (*Chenopodium capitatum*); and the Northern bedstraw, pink yarrow and white, pearly everlasting, and the pink everlasting are abundant in the open woods and along the roadsides. In shady places along streams several purple asters grew thriftily, the most showy being *Aster Fremontii;* and along the wet margins of the Bow River is found *Spiranthes Romanzoffiana* in great abundance and beauty. Great clumps of *Pedicularis Grœnlandica* brighten the banks of the Bow River with long spikes of magenta bloom. The pretty but less showy *Pedicularis bracteosa* is more abundant in wet woods. There are two gentians — the little *Gentiana acuta,* which is a pale lavender, and the sturdy, somewhat coarse *G. Forwoodii,* which is a deep blue, flecked on the corolla lobes with yellow. Along this river also is found that most beautiful flower, the shooting star (*Dodecatheon Meadia*).

Banff owes much of its popularity to the hot sulphur water that issues from Sulphur Mountain. The Government owns many of these springs. The hot overflow from the Government baths, known as the Cave and Basin, makes ponds which do not freeze over in winter, and on their borders are found plants which belong to a different latitude. Among these are the smaller fringed gentian (*Gentiana detonsa*) and *Lobelia Kalmii,* not only blooming ahead of time, but most of them growing in the warm water. One of the excursions to be made from here is to the "Hoodoos," — curious rock formations, — and on a smooth, sandy plateau near by were three kinds of flowers which nearly covered the ground — *Anemone patens* var. *Nuttalliana,* best known as the pasque flower, *Campanula rotundifolia,* and *Hedysarum Mackenzii.* The sandy roadway for a considerable distance was covered with a curious weed of the mustard family, *Physaria didymocarpa,* or bladder-weed. This derives its common name from the seeds being enclosed in woollen bladder-like sacs.

A striking feature of the National Park landscapes is the squirrel or fox-tailed grass, *Hordeum jubatum.* Clumps of it are found almost anywhere, but sometimes it takes possession of considerable areas of level ground, and, waving in the wind on a sunshiny morning, is one of the most beautiful pictures imaginable.

On a drive to Devil's Lake we collected blue flax, larkspurs, red anemone, and *Geum triflorum*. These grew on level spaces a little removed from the road. The roadsides proper were crowded with bluebells, fireweed, golden-rod, *Artemisia frigida*, erigerons, — pink, blue, and purple, — *Spiræa betulæfolia*, troximons, gaillardias, pink, white, blue, and purple peas, pearly everlasting, and pink and white yarrow.

The summits of Sulphur and Tunnel mountains were the abode of many small Alpine plants, mostly saxifrages and heaths.

From Banff to Laggan is but a few miles. The railroad skirts the Bow River, whose banks were brilliant with painted cup, fireweed, and patches of the Western red lily (*Lilium umbellatum*), just out of bloom. The swamps of Lake Louise were covered with beautifully colored sphagnum, and earlier in the season orchids had been abundant. The woods were filled with a great variety of fungi, many of which were brilliantly colored and fantastically shaped. Lichens covered everything available, and the mosses were exquisite and sometimes very curious. Lake Louise is the most beautiful place imaginable, combining mountains, forest, snow, glaciers, water, and sky in such proportions as to make it the perfection of scenery. The forests of coniferous trees, mostly spruces, are dark and dense with long beards of gray moss falling from their lower branches. The forests about Lake Louise have the advantage of having escaped fires. The most characteristic tree of the Canadian Rockies is neither the balsam nor the spruce, but Lyall's larch, which is found nowhere else. This is the last tree before reaching the snow-line. Its needles being deciduous and turning to a bright yellow before falling, a very noticeable band appears in August above the dark foliage of the evergreens.

The plants most noticeable about Lake Louise in August were Labrador tea, the white rhododendron, and *Kalmia glauca*. Cotton-grass covered the glacial meadows at the head of Lake Louise, and here was also *Epilobium latifolium* growing abundantly. *Senecio triangularis* grew on the steep sides of the valley, and was the only species of senecio seen, though at Banff there were several. Here were also seen *Saxifraga Lyallii*, fireweed, yellow columbine (*Aquilegia flavescens*), the blue (*A. brevistyla*), and the red (*A. formosa*).

A pretty little anemone (*A. parviflora*) bloomed almost in the

snow. Still farther up the valley, on the lateral moraine, a flower garden awaited us. Masses of purple pentstemons, the pink moss campion, the night-blooming catchfly, *Dryas Drummondii*, *Castilleia pallida*, small species of potentilla, a dwarf bluebell, and specimens of a large rankly growing yellow thistle covered the steep slope. At Mirror Lake we found *Arnica cordifolia*, brilliant yellow and delightfully fragrant, *Valeriana sitchensis*, and erigerons more beautiful than any we had yet seen. In the woods near Mirror Lake were the lovely pink bells of *Bryanthus empetriformis*, and at the upper lake — Lake Agnes — *Cassiope tetragona* and *C. hexagona*. The last pitch of the climb to Lake Agnes was made beautiful by the Alpine flowers — *Saxifraga bronchialis*, *Sedum stenopetalum*, etc. Castilleia, pentstemons, and columbines were everywhere. All around these lakes, wherever there is moisture enough, is found the most beautiful of all the wild flowers — *Myosotis sylvatica*, the forget-me-not.

Leaving Laggan, we proceeded to Glacier through the most beautiful scenery. Here the trees increased in size, and one would hardly recognize them as the same species that we had seen in the Rockies — Engelmann's spruce, Patton's hemlock, the Douglas fir, the white pine, balsams, and flat cedar. In fact, these were all we had seen in the Rockies, except Lyall's larch. These forests are as difficult to penetrate — off the trail — as a tropical jungle. One of the worst obstacles to progress is the devil's club (*Fatsia horrida*), — a plant of the Ginseng family, — five or six feet tall, with countless sharp spines. Another barrier to progress is furnished by the alders, whose low branches are prostrate and spread in every direction. The bushes grow as compactly as a cultivated hedge and are as impassable. The flowers still in bloom at Glacier were few, several saxifrages, *Tiarella unifoliata*, painted cup, fireweed, crimson and yellow monkey flowers, etc. On the snow-sheds were many plants common to the East. Plants new to us were the goat's-beard spiræa, salmonberry, and a little claytonia. We saw in fruit, *Actæa spicata*, *Streptopus amplexifolius* and *S. brevipes*, and *Smilacina racemosa*. We found a most delicious blueberry and an abundance of raspberries.

Much interest was added to the lecture by stereopticon views of mountain scenery and flowers, the latter colored by Mrs. Van Brunt.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1898.

PART II.

BOSTON:
PRINTED FOR THE SOCIETY.
1899.

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TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, May 7, 1898.

An adjourned meeting of the Society was holden at eleven o'clock, the President in the chair.

A memorial of Fearing Burr, prepared by the Committee appointed for that purpose at the last meeting, was presented by the Secretary and was unanimously adopted, and it was ordered that it be entered on the records, and that a copy be sent to the family of the deceased. This memorial is as follows:

MEMORIAL OF FEARING BURR.

By the sudden death of Mr. Fearing Burr, on the fourth of October last, the Massachusetts Horticultural Society has lost one of its oldest as well as one of its former useful and interested members. His age at his decease was eighty-one years nine months and twenty-three days. He was elected a Life Member of the Society in 1852, having been proposed for membership by its late Vice-President, George W. Pratt, Esq.

Mr. Burr's horticultural experience began in early life, when he was employed upon the family estate, which covers many acres in the rear of the paternal homestead. The experience thus gained, added to his inherited tastes and subsequent business pursuits as copartner for twelve or more years with his cousin, Matthew H. Burr, under the firm name of M. & F. Burr, Seedsmen, of Boston, undoubtedly gave him creditable notice as a prominent horticulturist throughout the New England States, as well as in more distant localities. His correspondence and dealings with horticulturists and seedsmen from over-sea were not infrequent.

In 1865 he published "The Field and Garden Vegetables of America," a work of 674 pages, octavo. He also was a frequent

contributor upon various horticultural subjects connected with the farm and garden.

Mr. Burr had served this Society upon several of its important Committees, including those on Fruits, Vegetables, etc. He was one of a Committee to visit the Durfee gardens at Fall River, and was the recipient of several of the Society's valuable medals at various times. In 1857 the firm of M. & F. Burr was awarded a silver medal for its display of "Sixty Varieties of Beans, all neatly and correctly labelled." Medals were also awarded him on Burr's sweet corn, hybrids from which are now known under another name.

Mr. Burr was a diligent reader, a good converser and debater; and whatever topics were brought up, either in private or public discussion in which he took part, his remarks were received with attention for their real merit and practical bearing. He was never married. A brother and sister are all that remain of the family, and they will find in the treasures of memory the richest memorials of the many virtues which were the ornaments of his character.

Respectfully submitted by

GEORGE LINCOLN,
EDMUND HERSEY, } *Committee.*
STARKES WHITON,

William C. Strong announced the decease of Ex-President James F. C. Hyde, and read the following memorial, which he had prepared:

MEMORIAL OF J. F. C. HYDE.

In the decease of Hon. J. F. C. Hyde, on the second instant, the Massachusetts Horticultural Society is called upon to mourn the loss of one of its earliest, most active, and constant members. For fifty years he has taken an interest and a prominent part in its exhibitions and in the administration of its government. With a natural fondness for the cultivation of the soil, he first engaged in the nursery business, and developed in an unusual degree a love for fruits and flowers, with a keen and critical appreciation of their quality, so that he was soon recognized as an authority in their nomenclature. For this reason he became at once a valued member of this Society, and for several years he served as Chairman of the Fruit Committee. In the year 1859

he was chosen a Vice-President, and served until the year 1866, when he was elected President, serving in this office for four years. He had marked success in the cultivation and exhibition of strawberries and other fruits, and also in seedling gladioli, carnations, sweet peas, and various other flowers, in the improvement of which he was an enthusiast. His example in finding delight and relief from the pressing activities of business and political life in the selection of best varieties, and in raising the standard of cultivation in the garden and orchard, was conspicuous and worthy of all imitation. It is with grateful emotions that we recall the good and useful work which he has done, the influence of which will live though he has passed on.

Of the many other important public services which Mr. Hyde has rendered in other fields of usefulness it is not our province to speak. But in his connection with this Society, which contributes so largely and so directly to the welfare of the community, we desire to express hearty testimony to his very great ability, enthusiastic devotion, and valuable service. It is, therefore,

Voted, That this testimonial be entered upon the records of the Society, and that a copy thereof be sent to the family of our deceased friend, with the assurance of our deep sympathy with them in their and our loss. The remembrance of his active and faithful life of service will be a precious and abiding legacy to them, and we trust will give a bright assurance of a higher immortal life.

The above memorial was unanimously adopted.

The President announced that Charles S. Sargent would be unable to serve as Chairman of the Committee to prepare a memorial of the late Hon. John Simpkins, and that he had appointed Hon. Charles F. Sprague to fill the vacancy.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

FREDERICK H. KENNARD, of Brookline.
WILLIAM ENDICOTT, 3d, of Boston.
MRS. GEORGE P. SANGER, of Boston.
FRANK BRUNTON, of Boston.

Adjourned to Saturday, June 4.

BUSINESS MEETING.

SATURDAY, June 4, 1898.

An adjourned meeting of the Society was holden at eleven o'clock today, the President in the chair.

No business being brought before the meeting it was Dissolved.

BUSINESS MEETING.

SATURDAY, July 2, 1898.

A duly notified Stated Meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following amendment to the Constitution and By-Laws, introduced at the Stated Meeting on the second of April, and then ordered by a majority vote to be entered on the record, came up for final action, and having received a two-thirds vote, was declared adopted:

SECTION XVII., A.

COMMITTEE ON FORESTRY AND ROADSIDE IMPROVEMENT.

A Committee on Forestry and Roadside Improvement of five members shall give special attention to the subject of the preservation and improvement of the woodlands of Massachusetts; shall lend its assistance, so far as possible, to securing the planting of trees, and the preservation of those already planted, upon the borders of the highways of the Commonwealth; shall secure, so far as shall seem to it expedient, the enforcement of the laws of the Commonwealth relative to forests and trees; shall, with the approval of the Society, petition the Legislature for such changes in and additions to the laws as shall make them more efficient; shall submit to the Committee on Lectures and Publication plans for lectures, essays, and discussions on Forestry subjects; and shall have authority, with the approval of the Executive Committee, to offer prizes for written contributions to forestry knowledge, not exceeding the amount which the Society may place at its disposal.

The following named persons were then, agreeably to the above section of the Constitution and By-Laws, elected a Standing Committee on Forestry and Roadside Improvement:

HARVEY N. SHEPARD, *Chairman.*
NATHANIEL S. SHALER, JOHN G. JACK,
J. D. W. FRENCH, JAMES H. BOWDITCH.

The President, as Chairman of the Executive Committee, reported from that Committee a recommendation, adopted at the meeting of the Committee on the 30th of April, that the Society appropriate $150 for the use of the Committee on Forestry, etc. The appropriation was unanimously voted.

WILLIAM THATCHER, of Brookline, and
JOHN A. PETTIGREW, of Jamaica Plain,

having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected.

The following named persons, recommended by the Executive Committee, were elected Corresponding Members of the Society:

PETER BARR, of London, England.
JOHN GILBERT BAKER, F.R.S., F.L.S., Keeper of the Herbarium of the Royal Gardens, Kew, England.
F. W. BURBIDGE, M.A., Curator of Trinity College Botanic Gardens, Dublin, Ireland.
F. W. MOORE, Director of the Royal Botanic Gardens, Glasnevin, Dublin, Ireland.
ARCHIBALD F. BARRON, Turnham Green, London, W., England.

Adjourned to Saturday, August 6.

BUSINESS MEETING.

SATURDAY, August 6, 1898.

An adjourned meeting of the Society was holden today at eleven o'clock, Vice-President SAMUEL HARTWELL in the chair.

The Chair announced the following named Committee, appointed by the President, agreeably to the Constitution and

By-Laws, to nominate candidates for Officers and Standing Committees of the Society for the year 1899:

William H. Spooner, *Chairman.*

Benjamin M. Watson,	Patrick Norton,
Samuel Hartwell,	Azell C. Bowditch,
Benjamin P. Ware,	Charles F. Curtis.

It was voted that the Nominating Committee be empowered to fill any vacancies that might occur in their number.

The Secretary laid before the meeting a letter from John Gilbert Baker, Keeper of the Herbarium and Library of the Royal Botanic Gardens, Kew, England, expressing his sense of the high honor conferred on him by electing him a Corresponding Member of the Society.

Adjourned to Saturday, September 3.

BUSINESS MEETING.

SATURDAY, September 3, 1898.

An adjourned meeting of the Society was holden at eleven o'clock today, President APPLETON in the chair.

William H. Spooner, Chairman of the Committee appointed at the last meeting to nominate candidates for Officers and Standing Committees for the year 1899, reported a printed list, which was accepted. It was voted that the Committee be continued and requested to nominate candidates to fill any vacancies that might occur before the election.

The Secretary presented a memorial of Hon. John Simpkins, prepared by Hon. Charles F. Sprague, Chairman of a Committee appointed for that purpose. The memorial, which was unanimously adopted, is as follows:

MEMORIAL OF HON. JOHN SIMPKINS.

The Honorable John Simpkins was born in New Bedford, June 27, 1862. He spent his early years in Yarmouth, and laid the foundation of a healthy physique, which later made him distinguished as an athlete. He attended St. Mark's School, and went to Harvard, where he spent four years, graduating in the class of 1885. During his collegiate career he was one of the most popular men, and his sunny and cheery disposition brought

him many life-long friendships. He was also a first-class football player, and was ever in the thickest of the contest, and one of the most valuable men on the team.

He was always devoted to the Cape District, and spent all his leisure hours there, and, taking a great interest in horticultural matters, he exhibited many and various plants, chiefly chrysanthemums, and those of an aquatic nature, and took many prizes in the exhibitions of the Massachusetts Horticultural Society.

He took a great interest in public matters, and in 1891 and 1892 was elected to the State Senate as a Republican, and, although opposed to the Hon. William E. Russell on political grounds, enjoyed the firmest personal friendship with him during his term of service. In 1892 Mr. Simpkins was chosen a Presidential Elector, and in the same year was elected President of the Republican Club of Massachusetts, succeeding the Hon. Roger Wolcott. His course, while acting in this latter capacity, made him very popular with the members of the Club, and brought out his powers of organization, for which he was particularly distinguished.

In 1894 there was a call from the Cape end of the Thirteenth District that it should have a Representative in Congress, as no Representative had been granted them for over thirty years, and Mr. Simpkins was picked out for their candidate. He was nominated and elected by a large majority, and so valuable were his services that he was reëlected in 1896. His familiarity with the harbors and lighthouses on the long stretch of coast surrounding his district enabled him to appear before Committees in Congress, and to present their necessities in an interesting way. He was very successful in having his projects adopted, and when he was to speak on such matters his colleagues listened, for he was talking about what he knew.

Just before his untimely death he was selected by the unanimous vote of his colleagues from Massachusetts to represent them on the National Republican Committee, and this was their tribute to his good judgment.

In Congress he was much respected for his sterling character, his honesty, his genial nature, and his power of persuasion. His intimate friends will never forget his loss.

For the Committee,

CHARLES F. SPRAGUE.

The decease of George W. Campbell, of Delaware, Ohio, a Corresponding Member of the Society, of E. Lewis Sturtevant, M.D., and of David Nevins, was announced, and it was voted that the President appoint Committees to prepare memorials of these members. The President accordingly appointed as a Committee to prepare a memorial of Mr. Campbell, Benjamin G. Smith, Charles F. Curtis, and Robert Manning; to prepare a memorial of Dr. Sturtevant, William C. Strong, J. D. W. French, and Benjamin P. Ware; and to prepare a memorial of Mr. Nevins, N. I. Bowditch, Joseph H. Woodford, and J. Woodward Manning.

The Secretary laid before the Society letters from F. W. Moore, Director of the Royal Botanic Gardens, Glasnevin, Dublin, Ireland, and F. W. Burbidge, Curator of the Botanical Gardens of Trinity College, Dublin, Ireland, acknowledging their election as Corresponding Members of the Society, and returning hearty thanks therefor.

Acknowledgments of the courtesy of the Society in giving the use of its Halls to the Society for the Promotion of Agricultural Science, the Linnæan Fern Chapter, and the American Forestry Association, with thanks therefor, were received from those organizations.

The following vote, moved by Joseph H. Woodford, was unanimously passed:

Voted, That the Treasurer cause to be engraved the names of the persons represented on all the busts in our Hall not now named.

The meeting was then dissolved.

BUSINESS MEETING.

SATURDAY, October 1, 1898.

A Stated Meeting of the Massachusetts Horticultural Society, being the Annual Meeting for the choice of Officers and Standing Committees, was holden today at eleven o'clock, Vice-President C. H. B. BRECK in the chair.

The Secretary stated that the meeting had been duly notified to the members of the Society agreeably to the Constitution and By-Laws.

William H. Spooner, Chairman of the Nominating Committee, reported that that Committee had nominated J. Woodward Manning as a member of the Committee on Forestry and Roadside Improvement, in place of James H. Bowditch, who was unable to serve. The report was accepted.

The Chair, agreeably to the Constitution and By-Laws, appointed Hon. Aaron Low, C. C. Shaw, and Francis Campbell a Committee to receive, assort, and count the votes given and report the number. The polls were opened at quarter past eleven o'clock.

William C. Strong, Chairman of the Committee appointed at the last meeting to prepare a memorial of Dr. E. Lewis Sturtevant, reported the following, which was unanimously adopted:

Memorial of Edward Lewis Sturtevant.

Edward Lewis Sturtevant, M.D., was born in Boston in 1842, was graduated from Bowdoin College in 1863, and from the Harvard Medical School in due course. He settled in South Framingham, and soon devoted himself to scientific agriculture on a large scale. He also became interested, with his brother, Joseph N. Sturtevant, in the breeding of dairy cattle, and was an earnest advocate of the Ayrshire stock, publishing a monograph entitled "The Dairy Cow." He became a life member of this Society in 1871, and for several years was an active member of the Committee on Publication and Discussion. In 1875 he established a new monthly magazine in Boston, entitled the "Scientific Farmer," which he continued for several years. In the year 1881 he was elected the first Director of the New York Experiment Station, which office he held for six years. In 1887 he was elected President of the national Society for the Promotion of Agricultural Science. In these many and varied fields of labor Dr. Sturtevant showed an active mind, quick to perceive possibilities, and alert to enter upon experiments with minute investigation. That he was successful in the various lines of work which he pursued is attested by the positions of honor to which he was called.

In his death, which occurred on the thirtieth of July last, at South Framingham, the Society mourns the loss of one of its most active, intelligent, and enthusiastic supporters — one who had in former years contributed largely to the interests of its library, its discussions, and its exhibitions. His many services will be held in grateful remembrance. The sympathy of the Society is hereby extended to the family and relatives of the deceased.

WM. C. STRONG, } *Committee.*
BENJ'N P. WARE, }

Benjamin G. Smith, Chairman of a Committee appointed at the last meeting to prepare a memorial of George W. Campbell, reported the following, which was unanimously adopted:

MEMORIAL OF GEORGE W. CAMPBELL.

George Washington Campbell, of Delaware, Ohio, was born in Cherry Valley, N.Y., January 12, 1817, and died July 15, 1898. He was one of the foremost and best known horticulturists of this country, and an amiable, refined, and accomplished gentleman of high scientific attainments. For more than forty years Mr. Campbell had been a devoted student of the science of horticulture, and in practice he had been eminently successful in originating and again in improving, some of the finest and most popular varieties of fruits, especially grapes. Among the best known and most valuable which he introduced and disseminated is the Delaware grape. The Campbell's Early, which was originated by him after years of careful, intelligent painstaking, developed into beautiful perfection, and is now rich in its promise of reward for all his tender care of this last gift to the science he so loved and honored. His extensive glass houses in other years witnessed, too, to the cultured world; here floriculture shared in this intelligent care and love of fruits, in both of which he was looked upon as a standard authority.

Mr. Campbell was elected a Corresponding Member of this Society in 1875. For many years he was President of the Ohio State Horticultural Society. He was also a member of the American Association of Nurserymen, and was appointed by President Hayes United States Commissioner to the Paris World's Fair in 1879. He was a member of the American Pomological Society

from its beginning, and at its last session, at Columbus, Ohio, was elected its First Vice-President. At this session, which occurred only a year ago, he appeared to be full of energy and life, and took as much interest in the proceedings as any of the youngest members. He was ready to give his unbiased opinion to those who sought it, and his death will be a severe loss, not only to his family and many friends, but to American horticultural interests generally.

Mr. Campbell was married August 27, 1846, to Miss Elizabeth Little, the golden wedding of which happy union was quietly celebrated in 1896, and the wife of these fifty years of only golden memories, and three children, miss and mourn a more than usually loving and devoted husband and father. Mr. Campbell was a good citizen, a warm friend, a devoted churchman, and a Christian gentleman. To the members of his family this Society tenders its sincere sympathy in their affliction.

BENJ. G. SMITH,
CHARLES F. CURTIS, } *Committee.*
ROBERT MANNING,

A report was presented from the Executive Committee, unanimously recommending that an additional appropriation of $39 be made for prizes for flowers in 1897, agreeably to the request of the Committee on Flowers. The appropriation was unanimously voted.

The following vote, moved by Henry L. Clapp, was unanimously passed in the affirmative:

Voted, That all exhibitions of native plants, heretofore in charge of the Flower Committee, be transferred to the Special Committee on School Gardens and Children's Herbariums, said Committee to have full power to award prizes and gratuities in such manner as they may consider best for the interests of the Society.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

CHARLES J. SANTHESON, of Reading.
THOMAS ALLEN, of Boston.
EDWIN C. LEWIS, of Taunton.
DAVID FRANK ROY, of Malden.

The polls were closed at a quarter past one.

The Committee to receive, assort, and count the votes, and report the number given, reported the whole number of ballots cast to be fifty, and that the persons named on the ticket presented by the Nominating Committee had a plurality and were elected.

The report was accepted, and the persons named on the above-mentioned ticket were, agreeably to the Constitution and By-Laws, declared by the Chairman to have a plurality of votes, and to be elected Officers and Standing Committees of the Society for the year 1899.

Adjourned to Saturday, November 5.

BUSINESS MEETING.

SATURDAY, November 5, 1898.

An adjourned meeting of the Society was holden today at eleven o'clock, the President in the chair.

The President, as Chairman of the Executive Committee, reported from that Committee a recommendation that the Society make the same appropriations for Prizes and Gratuities for the year 1899 as the present year, viz.:

For Prizes and Gratuities:

For Plants	$2,000
" Flowers	2,668
" Fruits	1,732
" Vegetables	1,200
" Gardens	500
Total for Prizes and Gratuities for the year 1899 .	$8,100

The report was accepted, and, agreeably to the Constitution and By-Laws, was laid over for final action until the first Saturday in January next.

The following votes were unanimously passed:

Voted, That this Society extend to the National Farmers' Congress the free use of its Halls and Library, for their meeting of

1899, if they shall honor this State and City by deciding to meet here.

Voted, That the President of this Society be authorized to attend the National Farmers' Congress, at Fort Worth, Texas, December 4–16, 1898, and act as a delegate from this Society.

The Secretary laid before the Society a letter acknowledging, in behalf of the family of the late Dr. E. Lewis Sturtevant, the memorial of him adopted by the Society, and expressing the value in which they held the appreciation of his work by the Society.

The decease of Isidor Bush, of Bushberg, Missouri, a Corresponding Member of the Society, was announced, and it was voted that the President appoint a Committee of three to prepare a memorial of Mr. Bush. The President appointed as that Committee William C. Strong, J. W. Manning, and Samuel Hartwell.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were upon ballot duly elected:

Miss Mabel Congdon, of Cambridge.
Miss Helen F. Ayers, of Medford.
Henry A. Root, of Winthrop Highlands.

Adjourned to Saturday, December 3.

BUSINESS MEETING.

Saturday, December 3, 1898.

An adjourned meeting of the Society was holden today at eleven o'clock, the President in the chair.

The Annual Report of the Committee on Flowers was presented by J. Woodward Manning, Chairman, accepted, and referred to the Committee on Publication.

The Annual Report of the Committee on the Library was read by W. E. Endicott, Chairman, accepted, and referred to the Committee on Publication.

J. Woodward Manning, for the Committee on Establishing Prizes, presented the List of Prizes recommended by that Com-

mittee to be offered for the year 1899, and stated the principal changes from that of the present year. The report was accepted and referred to the Committee on Publication, to be printed as the Schedule of Prizes for 1899.

A document establishing the Henry A. Gane Memorial Fund was read and referred to the Finance Committee.

It was voted to extend to the State Board of Agriculture the free use of the Society's Halls and Library for their Annual Meeting in December, 1899, if they shall honor the City by deciding to meet here.

The following named persons were appointed members of the Committee on School Gardens and Children's Herbariums for the year 1899:

Henry L. Clapp, *Chairman.*

George E. Davenport,	Mrs. M. L. Stevens,
Miss Katharine W. Huston,	Charles W. Jenks,
Mrs. P. D. Richards,	William E. C. Rich, *Secretary.*

A letter was read from William A. Taylor, Secretary of the American Pomological Society, asking for the appointment of a delegation to the meeting of that Society (probably at Philadelphia) in September, 1899. It was voted that the Fruit Committee, with such as they may join, constitute that delegation.

The following named persons, having been recommended by the Executive Committee, were on ballot duly elected to member ship in the Society:

HOWARD MARSTON, of Boston.
ROBERT LAURIE, of Newport, R.I.
JOHN C. DALY, of Roxbury.
ERNST G. ASMUS, of West Hoboken, N.J.

Adjourned to Saturday, December 17.

BUSINESS MEETING.

SATURDAY, December 17, 1898.

An adjourned meeting of the Society was holden today at eleven o'clock. Neither the President nor either of the Vice-Presidents being present, the meeting was called to order by the

Secretary, and Ex-President William H. Spooner was unanimously elected Chairman *pro tem.*

The Report of the Committee on Plants, the Report of the Committee on Vegetables, the Report of the Committee of Arrangements, and the Report of the Secretary and Librarian were presented. It was

Voted, That these reports be accepted without reading, and referred to the Committee on Publication, provided that that Committee will have them printed within two months.

The Secretary laid before the Society a letter from the Secretary of the State Board of Agriculture, acknowledging the courtesy of the Society in offering the use of its Halls for the public winter meeting of the Board in 1899, and thanking the Society therefor.

Adjourned to Saturday, December 24.

BUSINESS MEETING.

SATURDAY, December 24, 1898.

An adjourned meeting of the Society was holden at eleven o'clock today, the President in the chair.

William C. Strong, Chairman of the Committee appointed at the meeting of the Society on the fifth of November to prepare a memorial of the late Isidor Bush, reported as follows:

MEMORIAL OF ISIDOR BUSH.

The Committee to whom was referred action in regard to the death of Isidor Bush present the following testimonial:

Isidor Bush died on the fifth of August, 1898, in the city of St. Louis, Missouri, of which city he had been a resident for the past forty-nine years. He was born at Prague, Bohemia, in 1822. As a result of participation in the revolution of 1848, he came to America in that year. During our Civil War he was Secretary to General Fremont. In the year 1865 he was a member of the State Convention of Missouri.

Soon after this he established a grape nursery at a locality in Missouri which he named Bushberg, and devoted himself to the

cultivation of this specialty with marked enthusiasm. He soon had a large collection of all the known species and varieties of our native grapes, and with the assistance of the eminent botanist Dr. George Engelmann a very complete classification of the various species was made and their characteristics were very fully described. To this Mr. Bush added a full description of over five hundred varieties of grapes, with careful directions as to propagation and culture. This work was embodied and published in what Mr. Bush modestly called a Catalogue, but since its first appearance it has proved to be of such practical usefulness, as well as of permanent value for its botanical research, that it has reappeared in several editions, has been translated into foreign languages, and is recognized as an authoritative Grape Manual.

It was through the enterprise of Mr. Bush that our immune grape roots were sent to Europe, for the purpose of grafting the vinifera varieties upon them, and thus preventing the ravages of the phylloxera. We knew Mr. Bush personally through his active membership in the American Pomological Society — a wide-awake, alert little man, always so cheery and responsive as to earn from President Wilder the endearing title "My Isidor." The Massachusetts Horticultural Society in 1878 elected Mr. Bush a Corresponding Member, and has received from him copies of his valuable treatises. And now that he has passed on, it places on its record its appreciation of his character, and the permanent value of his services.

It is further

Voted, That the Secretary be requested to send a copy of this action to the family of the deceased.

WILLIAM C. STRONG,
SAMUEL HARTWELL, } *Committee.*
JACOB W. MANNING,

After remarks by Mr. Manning, of the Committee, the testimonial was unanimously adopted.

The President, from the Finance Committee, to which was referred, at the meeting on the third of December, 1898, a document establishing the Henry A. Gane Memorial Fund, reported, recommending that the Society accept the donation.

Voted, That the Society accept the gift of one thousand dollars

from Mrs. Jerome Jones to constitute the Henry A. Gane Memorial Fund; that the Secretary write to Mrs. Jones expressing the thanks of the Society for the gift, and that the Treasurer be, and he hereby is, authorized to sign the receipt for $1,000.

The instrument of donation is as follows:

This instrument witnesseth: That Mrs. Jerome Jones doth hereby give unto the Massachusetts Horticultural Society the sum of One Thousand Dollars to hold in trust for the use or purposes following, and upon conditions set forth, namely:

To pay out of the income of said money, or funds of the said Society, the sum of fifty dollars, to be expended and applied in premiums, as follows:

PRIZES OFFERED FROM THE HENRY A. GANE MEMORIAL FUND.

For the best twelve specimen blooms of any of the seedling chrysanthemums originated by the late Henry A. Gane	$20 00
Second prize	10 00
For the best three specimen plants of any seedling chrysanthemums, not less than three varieties, originated by the late Henry A. Gane	12 00
Second prize	8 00

For the term of three years.

After said three years, Premiums as follows:

PRIZES OFFERED FROM THE HENRY A. GANE MEMORIAL FUND.

For the best twelve specimen blooms of any of the seedling chrysanthemums originated by the late Henry A. Gane	$20 00
For the best three specimen plants of any seedling chrysanthemums, not less than three varieties, originated by the late Henry A. Gane	15 00
For the best new seedling chrysanthemum originated by any other grower	15 00

At the end of ten years a change in the terms of these prizes may be made if agreed to by the donor and the Society.

Prizes not awarded at any time to be cumulative in the Fund.

The Massachusetts Horticultural Society hereby acknowledges the receipt of the above mentioned sum of One Thousand Dollars, the income to be expended as above provided.

(Signed) CHARLES E. RICHARDSON,
Treasurer Massachusetts Horticultural Society.

It was voted that all reports of committees not presented be referred to the Committee on Publication.

The meeting was then dissolved.

REPORT

OF THE

COMMITTEE ON PLANTS,

FOR THE YEAR 1898.

By AZELL C. BOWDITCH, CHAIRMAN.

Your Committee would say that the number of exhibitors was not as large the past year as in previous seasons. This is attributed to our being obliged to cut down some of the larger prizes, in order to make room for prizes for new things that are constantly brought to our notice, and at the same time to keep within the appropriation. For instance, the first prize for Groups of Plants, which form quite a feature, at the annual exhibition, is only twenty-five dollars. This will hardly pay a man for the carting, as it takes about fifty plants to make an acceptable group. This season there was but one exhibitor. We mention this as one of the ways in which your Committee are handicapped in their endeavors to interest the public and make the exhibitions creditable to the Society. The weather has been another factor with which we have had to contend. Cold and wet had made it almost impossible for us to give good exhibitions, and the postponing of shows is very disappointing.

January 1. — *Cypripedium bellatulum album* was exhibited for the first time in America, by William Wallace Lunt.

January 8. — Joseph H. White (James Wheeler, gardener) exhibited *Begonia incarnata superba*, which your Committee thought well of and for which they awarded a First Class Certificate of Merit.

January 22. — Cypripedium President McKinley, a new American seedling, parents *C. insigne Chantinii* and *C. Harrisianum su-*

perbum, raised by Hon. C. G. Roebling, of Trenton, N.J., was exhibited. Your Committee awarded it a First Class Certificate of Merit.

January 29. — Mrs. B. P. Cheney was awarded a Silver Medal for *Primula obconica grandiflora*, which your Committee thought well of as a window plant, as it will continue in bloom all the winter months.

March 5. — R. & J. Farquhar & Co. exhibited Narcissus Victoria, a large flower; color, light lemon to deep orange. It was quite an improvement over others of its class, and your Committee deemed it worthy of a First Class Certificate of Merit.

March 19. — W. W. Lunt exhibited Lælio-Cattleya Mrs. John D. Long, a hybrid between *Lælio-Cattleya elegans* var. *Warneri* and *Cattleya superba* var. *splendens*. While partaking of the characteristics of both parents, it was certainly a marked improvement, and is believed to be the first hybrid Lælio-Cattleya of American parentage. It was awarded a Silver Medal.

SPRING EXHIBITION.

March 22, 23, 24, and 25.

This exhibition was most certainly a success. The halls were well filled and most of the prizes were contended for. Among the most prominent exhibitors were John L. Gardner, Dr. C. G. Weld, and W. S. Ewell & Son, and their plants showed marked skill in cultivation and an improvement over plants of former years.

April 30. — Oakes Ames exhibited a very fine plant of Cypripedium Gertrude Hollington, a cross between *C. bellatulum* and *C. ciliolare*, the largest ever shown, having three flowers and three buds. It was awarded the Silver Gilt Medal.

June 11. — W. W. Lunt had a very fine plant of *Cattleya Morganæ superbum*, bearing a spike of very pure white flowers. It was awarded a Silver Gilt Medal.

ROSE AND STRAWBERRY EXHIBITION.

June 23 and 24.

W. P. Winsor, of Fairhaven, made a very fine display of Orchids, as did also John L. Gardner. Both were awarded prizes.

July 23. — Robert Laurie, of Newport, R.I., exhibited some pans of a very dwarf variety of Tropæolum, named Vesuvius. Your Committee think that from its very bright color and compact dwarf habit this may be a very useful bedding plant. They awarded it a First Class Certificate of Merit.

August 27. — Oakes Ames placed on the table *Cypripedium insigne* Laura Kimball, a beautiful yellow variety, quite distinct and well worthy a Silver Medal, which was awarded it.

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

September 29 and 30.

George McWilliam exhibited a fine lot of seedling Dipladenias, the most noteworthy of which was a beautiful pink variety named Elsa Whitin, for which was awarded a Silver Medal.

Oakes Ames was also awarded a Silver Medal for the introduction of *Dracæna Godseffiana*. Your Committee consider this novelty well worth growing.

CHRYSANTHEMUM EXHIBITION.

November 8, 9, 10, and 11.

This show had not nearly as many exhibitors as in former years, but what it lacked in quantity it made up in quality. J. S. Bailey had some very fine specimens, as did also Mrs. B. P. Cheney, who was a close second, with a fine lot of very compact and well-flowered plants. William Edgar made a fine display of Begonia Gloire de Lorraine, which your Committee think well of, its dwarf habit and constant flowering making it a most desirable house plant.

November 19. — George McWilliam made a fine display of seedling Dipladenias, one of which, Elizabeth K. Whitin, a beautiful pale pink with a rosy carmine throat, well marked, your Committee thought worthy of a Silver Medal.

Prospective Prize.

The Committee have awarded to James Wheeler the Society's Prospective Prize for the best Seedling Flowering Plant, a seedling white Azalea, $30.

This Azalea has been exhibited for three years. The flower is very large, pure white, of fine shape, and has very firm petals.

Amount appropriated		$2,000 00
Awarded in Premiums and Gratuities .	$1,516 00	
Fifteen Silver Medals	105 00	
Three Silver Gilt Medals	45 00	
Total		1,666 00
Balance unexpended		$334 00

All of which is respectfully submitted,

A. C. Bowditch,
Chairman.

PRIZES AND GRATUITIES AWARDED FOR PLANTS.

1898.

JANUARY 1.

Gratuity: —

Henry A. Wheeler, Rose plant	$1 00

JANUARY 8.

CHINESE PRIMROSES. — Six plants, in six-inch pots:

First, Mrs. B. P. Cheney	5 00
Second, Joseph H. White	4 00
Third, Mrs. B. P. Cheney	3 00

Gratuities: —

E. S. Converse, Display of Primroses	3 00
John L. Gardner, *Primula stellata*	3 00
Mrs. B. P. Cheney, " "	2 00

JANUARY 15.

Gratuity: —

James E. Rothwell, Display of Orchids	4 00

JANUARY 22.

Gratuity: —

Hon. C. G. Roebling, Trenton, N.J., Display of Orchids	3 00

FEBRUARY 12.

Gratuity: —

J. E. Rothwell, *Cypripedium Sallierii*, *C. concolor*, and *C. nitens superbum*	2 00

FEBRUARY 19.

Gratuity: —

John L. Gardner, Six plants of *Primula Sinensis* (double)	3 00

FEBRUARY 26.

Gratuity: —

James Comley, *Cypripedium villosum*	3 00

MARCH 12.

Gratuities: —

J. E. Rothwell, Display of Orchids	3 00
Rea Brothers, Rose plant	1 00

MARCH 19.

Gratuity: —

Edward Butler, *Dendrobium nobile*	5 00

SPRING EXHIBITION.

MARCH 22, 23, 24, AND 25.

Theodore Lyman Fund.

INDIAN AZALEAS. — Four named varieties:	
First, Dr. C. G. Weld	12 00
Second, J. W. Howard	10 00
Two named varieties:	
First, Edward Butler	6 00
Specimen plant, named:	
First, Edward Butler	10 00
Second, Dr. C. G. Weld	8 00
Third, Dr. C. G. Weld	5 00

Society's Prizes.

ORCHIDS. — Three plants:	
Second, John L. Gardner	8 00
Single plant:	
First, John L. Gardner	5 00
STOVE OR GREENHOUSE PLANT. — Specimen in bloom, other than Azalea or Orchid:	
First, Dr. C. G. Weld	10 00
Second, Dr. C. G. Weld	8 00
CLIMBING ROSE. — Specimen plant in bloom:	
First, C. H. Souther	8 00
HARDY FLOWERING DECIDUOUS SHRUBS, FORCED. — Four, of four distinct species, named:	
First, Bussey Institution	6 00
Second, Bussey Institution	4 00
HARDY PRIMROSES. — Twelve plants, of distinct varieties:	
First, John L. Gardner	8 00
HARDY POLYANTHUSES. — Twelve plants, of distinct varieties:	
First, John L. Gardner	8 00
Second, John L. Gardner	6 00
Third, Dr. C. G. Weld	4 00
AURICULAS. — Six, in pots:	
First, Dr. C. G. Weld	6 00
Second, Dr. C. G. Weld	4 00
CYCLAMENS. — Ten plants:	
First, J. S. Bailey	15 00
Second, Mrs. B. P. Cheney	12 00
Ten plants, in seven-inch pots:	
First, Mrs. B. P. Cheney	8 00
Second, Mrs. B. P. Cheney	6 00
Third, J. S. Bailey	4 00

Single plant:	
First, Mrs. B. P. Cheney	5 00
Second, James Garthley	4 00
Third, J. S. Bailey	3 00
CINERARIAS. — Six varieties:	
First, C. H. Souther	10 00
Second, John L. Gardner	8 00
Third, Dr. C. G. Weld	6 00
Fourth, E. S. Converse	4 00
Three varieties:	
First, James Garthley	6 00
Second, Dr. C. G. Weld	5 00
Third, E. S. Converse	4 00
Single plant:	
First, C. H. Souther	4 00
Second, John L. Gardner	3 00
Third, E. S. Converse	2 00
HYACINTHS. — Twelve named varieties, in pots:	
First, John L. Gardner	6 00
Second, Dr. C. G. Weld	4 00
Third, Bussey Institution	3 00
Six named varieties, in pots, one in each pot:	
First, Bussey Institution	5 00
Second, John L. Gardner	4 00
Third, E. S. Converse	3 00
Single named bulb, in pot:	
First, E. S. Converse	2 00
Second, John L. Gardner	1 00
Three pans, not to exceed twelve inches, ten bulbs of one variety in each pan:	
First, Dr. C. G. Weld	6 00
Second, John L. Gardner	4 00
Third, Bussey Institution	3 00
Two pans, not to exceed twelve inches, ten bulbs of one variety in each pan:	
First, John L. Gardner	4 00
Second, Dr. C. G. Weld	3 00
Third, E. S. Converse	2 00
Single pan, not to exceed twelve inches, with ten bulbs of one variety:	
First, Bussey Institution	3 00
Second, Bussey Institution	2 00
Third, E. S. Converse	1 00
TULIPS. — Six eight-inch pans, nine bulbs of one variety in each:	
First, Dr. C. G. Weld	4 00
Second, Bussey Institution	3 00
Third, W. S. Ewell & Son	2 00

Three eight-inch pans, nine bulbs of one variety in each:

First, E. S. Converse	3 00
Second, W. S. Ewell & Son	2 00
Third, Bussey Institution	1 00

Three ten-inch pans, twelve bulbs of one variety in each:

First, Dr. C. G. Weld	5 00
Second, Bussey Institution	4 00
Third, Dr. C. G. Weld	3 00

POLYANTHUS NARCISSUS. — Four seven-inch pots, four bulbs in each, distinct varieties:

First, John L. Gardner	4 00
Second, Bussey Institution	3 00

JONQUILS. — Six pots or pans, not exceeding eight inches, the number of bulbs in each to be at the discretion of the grower:

First, W. S. Ewell & Son	4 00
Second, Dr. C. G. Weld	3 00
Third, John L. Gardner	2 00

NARCISSUSES. — Six eight-inch pans, distinct varieties, single or double:

First, W. S. Ewell & Son	4 00
Second, Dr. C. G. Weld	3 00

Three eight-inch pans:

First, W. S. Ewell & Son	3 00
Second, Bussey Institution	2 00

LILIUM HARRISII. — Six pots, not exceeding ten inches:

First, J. W. Howard	10 00
Second, J. W. Howard	8 00

LILY OF THE VALLEY. — Six pots or pans, not exceeding ten inches:

First, Bussey Institution	4 00

CROCUSES. — Three ten-inch pans, distinct varieties:

First, W. S. Ewell & Son	3 00

ANEMONES. — Three pots or pans:

First, Bussey Institution	4 00
Second, Bussey Institution	3 00

FREESIAS. — Six pots or pans:

First, Dr. C. G. Weld	3 00

IXIAS. — Six pots or pans, in varieties:

First, Dr. C. G. Weld	4 00

TRITONIAS. — Six pots or pans, in varieties:

First, Dr. C. G. Weld	3 00

ROMAN HYACINTHS. — Six eight-inch pans, ten bulbs in a pan:

First, Dr. C. G. Weld	3 00
Second, W. S. Ewell & Son	2 00
Third, Bussey Institution	1 00

GENERAL DISPLAY OF SPRING BULBS. — All classes:

First, W. S. Ewell & Son	15 00
Second, Bussey Institution	12 00

Gratuities:—

Bayard Thayer (James Brydon, gardener), *Cattleya Schröderæ*	4 00
Harvard Botanic Garden (Robert Cameron, gardener), *Dendrobium Fytchianum*	3 00
Joseph Tailby & Son, Climbing Rose	2 00
Bussey Institution, Grape Hyacinths	1 00
R. & J. Farquhar & Co., Lily of the Valley	2 00
William A. Bock, Display	8 00
Mrs. B. P. Cheney "	5 00
John L. Gardner "	5 00
James Garthley "	3 00
Dr. C. G. Weld "	2 00

APRIL 2.

Gratuity:—

Mrs. A. W. Blake, *Iberis perennis* and *Hydrangea Otaksa*	2 00

APRIL 9.

Gratuity:—

J. E. Rothwell, *Oncidium ampliatum*	3 00

APRIL 16.

Gratuities:—

Henry A. Wheeler, Crimson Rambler Rose	1 00
J. W. Howard, *Amaryllis vittata hybrida*, seedling	1 00

APRIL 23.

Gratuities:—

James Comley, *Cytisus albus*	2 00
Mrs. D. M. Folger, Gloxinia	1 00
C. E. Richardson, Seedling Amaryllis	1 00

APRIL 30.

Gratuity:—

Edward J. Mitton, *Chorizema Lowii*	3 00

MAY EXHIBITION.

MAY 7.

PELARGONIUMS. — Six named Show or Fancy varieties, in not less than eight-inch pots, in bloom:

First, N. T. Kidder	10 00

Six pots or pans of Ivy-Leaved, in bloom:

First, John Jeffries	6 00

INDIAN AZALEAS. — Six plants, in pots, named:	
First, Dr. C. G. Weld	8 00
Single specimen:	
First, Dr. C. G. Weld	3 00
Second, Dr. C. G. Weld	2 00
CALCEOLARIAS. — Six varieties, in pots:	
First, Mrs. B. P. Cheney	10 00
Second, Dr. C. G. Weld	8 00
Third, Mrs. B. P. Cheney	6 00
Fourth, J. S. Bailey	4 00
Single specimen:	
First, J. S. Bailey	3 00
Second, Mrs. B. P. Cheney	2 00
Third, E. S. Converse	1 00
ORCHIDS. — Display, named:	
First, J. E. Rothwell	12 00
Gratuities: —	
Edward J. Mitton, Display	2 00
Mrs. A. W. Blake, "	2 00

MAY 21.

Gratuities: —	
Mrs. A. W. Blake, Display of *Azalea Indica*	3 00
J. E. Rothwell, *Oncidium Marshallianum*	1 00

RHODODENDRON SHOW.

JUNE 7 AND 8 (*postponed from* JUNE 2 AND 3).

ORCHIDS. — Display arranged for effect, with foliage plants:	
First, John L. Gardner	30 00
Gratuities: —	
Kenneth Finlayson, *Cypripedium Lawrenceanum*, four pots	6 00
J. S. Bailey, *Cattleya Gaskelliana*	3 00
Kenneth Finlayson, Pelargoniums, six pots	5 00
Mrs. A. W. Blake, Display of Azaleas	3 00

ROSE AND STRAWBERRY EXHIBITION.

JUNE 23 AND 24.

GLOXINIAS. — Six plants in not less than eight-inch pots:	
First, James L. Little	8 00
ORCHIDS. — Six plants, of six named varieties, in bloom:	
First, W. P. Winsor	15 00
Second, W. P. Winsor	10 00

Three plants, of three named varieties, in bloom:

First, W. P. Winsor	10 00
Second, John L. Gardner	8 00

Single specimen, named:

First, W. P. Winsor, *Cœlogyne Dayana*	5 00
Second, W. P. Winsor, *Cypripedium grande atratum*	3 00

Gratuities: —

E. J. Mitton, Display of Pelargoniums	8 00
Walter Hunnewell, Hydrangeas	1 00

JULY 23.

Gratuity: —

Mrs. A. W. Blake, *Cattleya gigas*	1 00

JULY 30.

Gratuity: —

J. E. Rothwell, New American Cypripedium, *Lawrenceanum* × *Marshallianum*	2 00

AUGUST 6.

Gratuity: —

J. E. Rothwell, Cypripedium A. de Lairesse	5 00

AUGUST 13.

Gratuity: —

H. A. Wheeler, *Torenia Fournieri*	2 00

EXHIBITION OF AQUATIC PLANTS AND FLOWERS.

AUGUST 20.

OUVIRANDRA FENESTRALIS. —

First, E. S. Converse	8 00
Second, John L. Gardner	6 00

Gratuities: —

E. A. & W. K. Wood, *Stanhopea tigrina*	2 00
John L. Gardner, *Cypripedium Morganiæ*	1 00
E. J. Mitton, *Dieffenbachia Bausei* and *Cyanophyllum magnificum*	2 00
W. H. Lincoln, *Adiantum concinnum*	2 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

AUGUST 31 AND SEPTEMBER 1.

H. H. Hunnewell Fund.

HARDY CONIFEROUS TREES. — Display in pots and tubs, named:

First, Francis Blake	25 00

Society's Prizes.

PALMS. — Pair, in pots or tubs not more than twenty-four inches in diameter:

First, Dr. C. G. Weld	12 00

GREENHOUSE PLANTS. — Collection, containing foliage plants of all descriptions, not to exceed forty plants, in pots or tubs:

First, J. S. Bailey	40 00
Second, John L. Gardner	30 00

Six Greenhouse and Stove plants, of different named varieties, two Crotons admissible:

First, N. T. Kidder	25 00
Second, Dr. C. G. Weld	20 00
Third, John L. Gardner	15 00

TABLE DECORATION. — For fifteen covers, living plants, in one receptacle, only one entry admissible:

First, Mrs. E. M. Gill	10 00
Second, H. A. Wheeler	8 00
Third, E. S. Converse	6 00
Fourth, W. S. Lincoln	4 00

SPECIMEN FLOWERING GREENHOUSE PLANT. — Single named variety:

First, N. T. Kidder	8 00

CALADIUMS. — Six named varieties:

First, N. T. Kidder	8 00
Second, Dr. C. G. Weld	6 00

FERNS. — Six named varieties, no Adiantums admissible:

First, Dr. C. G. Weld	10 00

Specimen, other than Tree Fern:

First, H. H. Hunnewell	4 00
Second, N. T. Kidder	3 00

ADIANTUMS. — Five named varieties:

First, Dr. C. G. Weld	8 00

LYCOPODS. — Four named varieties:

First, Dr. C. G. Weld	5 00

DRACÆNAS. — Six named varieties:

First, Dr. C. G. Weld	8 00

CROTONS. — Six named varieties, in not less than eight-inch pots:

First, Dr. C. G. Weld	10 00

CYCAD. — Single plant, named:

First, H. H. Hunnewell	10 00
Second, James L. Little	8 00
Third, J. W. Howard	6 00

ORCHIDS. — Six plants, named varieties, in bloom:

First, J. E. Rothwell	15 00

Three plants, named varieties, in bloom:

Second, H. A. Wheeler	8 00

Single plant, in bloom:

First, J. E. Rothwell	5 00
Second, H. A. Wheeler	4 00

BEGONIA REX. — Six pots, of six varieties:

First, E. S. Converse	8 00
Second, E. J. Mitton	6 00

BEGONIAS, REX HYBRIDS. — Collection, named:

First, E. S. Converse	8 00
Second, E. J. Mitton	6 00

CANNAS. — Collection of not less than ten named varieties, grown in pots or tubs:

Second, C. H. Souther	8 00

Gratuities: —

Yamanaka & Co., Collection of Japanese plants	20 00
J. S. Bailey, *Adiantum Farleyense*	10 00
E. S. Converse, *Fittonia argyroneura*	2 00
J. W. Howard, Collection of Ferns	5 00
J. E. Rothwell, Thirty named Crotons	8 00
Charles H. Souther, Anthuriums	5 00
J. L. Little, Begonias	5 00
N. T. Kidder, Collection	10 00

SEPTEMBER 10.

Gratuity: —

Oakes Ames, *Cypripedium Gravesiæ*	1 00

SEPTEMBER 24.

Gratuity: —

James Comley, Rhododendron Maiden's Blush	2 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

SEPTEMBER 29 AND 30.

Gratuity: —

E. S. Converse, Display of Plants	25 00

OCTOBER 8.

Gratuities: —

J. E. Rothwell, *Oncidium varicosum* and *Cattleya aurea* var. *Rothwelliana*	3 00
E. J. Mitton, Two plants *Cattleya labiata*	3 00

OCTOBER 22.

Gratuity: —

J. E. Rothwell, *Cattleya labiata*	2 00

OCTOBER 29.

Gratuities: —

J. E. Rothwell, *Cypripedium Arthurianum pulchellum*	2 00
J. E. Rothwell, *Vanda cærulea*	2 00

CHRYSANTHEMUM EXHIBITION.

NOVEMBER 8, 9, 10, AND 11.

CHRYSANTHEMUMS. — Display of twelve named plants, any or all classes, distinct varieties:

First, J. S. Bailey	50 00
Second, Mrs. B. P. Cheney	40 00
Fourth, E. S. Converse	20 00
Three Japanese Incurved:	
First, Mrs. B. P. Cheney	10 00
Second, J. S. Bailey	7 00
Third, Mrs. B. P. Cheney	5 00
Three Reflexed, distinct named varieties:	
First, Mrs. B. P. Cheney	10 00
Second, J. S. Bailey	7 00
Third, Mrs. B. P. Cheney	5 00
Specimen Incurved, named variety:	
First, James Garthley	6 00
Second, J. S. Bailey	5 00
Third, J. S. Bailey	4 00
Specimen Reflexed, named variety:	
First, Mrs. B. P. Cheney	6 00
Second, J. S. Bailey	5 00
Specimen Anemone Flowered, named variety:	
First, J. S. Bailey	6 00
Second, Mrs. B. P. Cheney	5 00
Third, Mrs. B. P. Cheney	4 00
Specimen Pompon, named variety:	
First, Mrs. B. P. Cheney	4 00
Second, Mrs. B. P. Cheney	3 00
Twelve plants, of twelve different varieties, grown to one stem and bloom, in not over six-inch pots, preference being given to plants not more than three feet in height:	
First, Mrs. A. W. Blake	10 00
Second, Mrs. A. W. Blake	8 00
Third, Dr. C. G. Weld	6 00
Fourth, C. H. Souther	4 00
Six plants grown as above, but all of one color, Red:	
First, J. L. Little	5 00
Second, Dr. C. G. Weld	4 00
Third, E. S. Converse	3 00
White:	
First, Dr. C. G. Weld	5 00
Second, C. H. Souther	4 00
Third, J. L. Little	3 00

Pink:	
First, Dr. C. G. Weld	5 00
Second, Dr. C. G. Weld	4 00
Third, J. L. Little	3 00
Yellow:	
First, Dr. C. G. Weld	5 00
Second, J. L. Little	4 00
Third, James Nicol	3 00
Any other color:	
First, Mrs. A. W. Blake	5 00
Second, Dr. C. G. Weld	4 00
Third, Mrs. A. W. Blake	3 00
Group of Chrysanthemums, without stakes, arranged for effect, limited to one hundred square feet, and edged with ferns or low growing decorative plants:	
First, Mrs. A. W. Blake	25 00

Gratuities: —

William Edgar, Begonia Gloire de Lorraine	20 00
James Garthley, Chrysanthemum Le Colosse Grenoblois	3 00

NOVEMBER 19.

Gratuity: —

H. A. Wheeler, *Zygopetalum Mackayi* and *Cypripedium insigne*	2 00

NOVEMBER 26.

Gratuity: —

J. E. Rothwell, Five plants Begonia Gloire de Lorraine	5 00

DECEMBER 3.

Gratuity: —

H. A. Wheeler, Two Orchids	2 00

SILVER GILT MEDALS.

April 30. Oakes Ames, for Cypripedium Gertrude Hollington.
June 11. W. W. Lunt, for *Cattleya Morganiæ superba.*
Annual Exhibition of Fruits and Vegetables, September 29 and 30. Oakes Ames, for *Dracæna Godseffiana.*

SOCIETY'S SILVER MEDALS.

January 1. W. W. Lunt, for *Cypripedium bellatulum album.*
" 8. J. E. Rothwell, for *Odontoglossum Vuylstekeanum.*
" 29. Mrs. B. P. Cheney, for *Primula obconica grandiflora.*
March 19. W. W. Lunt, for Lælio-Cattleya Mrs. John D. Long.
April 16. J. E. Rothwell, for *Cypripedium niveum* var. *grandiflorum.*
May 14. J. E. Rothwell, for *Cypripedium bellatulum album.*
August 27. Oakes Ames, for *Cypripedium insigne* Laura Kimball.
Annual Exhibition of Plants and Flowers, August 31 and September 1.
H. H. Hunnewell, for *Asparagus Sprengeri.*
Yamanaka & Co., *Chamæcyparis obtusa nana.*

September 24. Oakes Ames, for Introduction of *Acalypha hispida*.
Annual Exhibition of Fruits and Vegetables, September 29 and 30.
J. E. Rothwell, for *Cypripedium insigne* var. *Sanderæ*.
Oakes Ames, for Seedling Cattleya.
George McWilliam, for New Seedling Dipladenia Elsa Whitin.
November 19. George McWilliam, for Three Seedling Cypripediums.
December 3. George McWilliam, for Five Seedling Dipladenias, including Dipladenia Elsa Whitin.

FIRST CLASS CERTIFICATES OF MERIT.

January 8. Joseph H. White, for *Begonia incarnata superba*.
" 22. Hon. C. G. Roebling, Trenton, N.J., for Cypripedium President McKinley.
" 29. Oakes Ames, for *Cattleya Trianæ* vars. *Amesiana* and *unicolor*.
February 19. W. W. Lunt, for *Cypripedium Lathamianum*.
" " James Comley, for Double Hybrid Prunus, from Japan.
March 5. R. & J. Farquhar & Co., for Narcissus Victoria.
April 16. J. E. Rothwell, for Cypripedium T. W. Bond.
" 30. W. W. Lunt, for *Oncidium Kramerianum*.
May Exhibition, May 7. J. E. Rothwell, for Phalænopsis Harrietta.
May 21. J. S. Bailey, for *Miltonia vexillaria Hilliana*.
June 18. Oakes Ames, for *Cattleya Mendelii* Mrs. A. C. Ames.
Rose and Strawberry Exhibition, June 23 and 24. J. B. Shurtleff, for new variety silver-leaved Pelargonium.
July 23. Robert Laurie, for Tropæolum Vesuvius.
August 6. Edward G. Uihlin, Chicago, Ill., for Display of Orchids.
Annual Exhibition of Fruits and Vegetables, September 29 and 30. Oakes Ames, for *Acalypha Godseffiana*.
October 22. Oakes Ames, for *Catasetum arachnoides*.
December 3. J. E. Rothwell, *Cypripedium insigne* var. *Schröderianum*.

HONORABLE MENTION.

January 22. Oakes Ames, for *Dendrobium Wardianum*.
April 23. J. E. Rothwell, for *Cypripedium leuchochilum*.
Rhododendron Show, June 7 and 8 (postponed from June 2 and 3). Walter Hunnewell, for Seedling Fuchsia Walter Hunnewell.
Rose and Strawberry Exhibition, June 23 and 24. W. E. Coburn, for Pelargonium Glendale.
September 24. Oakes Ames, for *Cypripedium Aspasia*.
October 29. R. & J. Farquhar & Co., for new Japanese Anemone.

AZELL C. BOWDITCH,
JAMES COMLEY,
JAMES WHEELER,
WILLIAM J. MARTIN,
ARTHUR H. FEWKES,
Committee on Plants.

REPORT

OF THE

COMMITTEE ON FLOWERS,

FOR THE YEAR 1898.

By J. WOODWARD MANNING, CHAIRMAN.

Your Committee would report on the work of the year as follows:

The total amount of prizes awarded is a fair criterion of the year's exhibitions, which, on the whole, have not been as numerous nor the prizes as closely contested for as in other years. While the effect, from exhibition to exhibition, has seemed much the same as in years past, yet a careful survey of the results shows considerable falling off from previous years. This may be due largely to abnormal weather conditions, which have, to a certain extent, interfered with the successful growth of the flowers and with their coming to perfection in season to admit of their being staged at the time indicated by the schedule. The quality of the flowers shown compares very favorably indeed with past years, and those exhibitors who for many years past have been constant contributors seem to show as lively an interest as in the past, and the increasing excellence of their exhibits is noticeable.

To review the year's work somewhat in detail, we would state that a very excellent exhibition of Chinese Primroses, shown in flat dishes, was made January 8, and the display was particularly noticeable for the unusual variety of color, individual size, and variations in form shown by the various flowers. Joseph H. White carried off the first prize and Walter E. Coburn the second.

January 15 Oakes Ames showed an unusually fine variety of *Cattleya Trianæ* under the name of Lilian Chatman, for which a Silver Medal was awarded, and Hon. C. G. Roebling, of Trenton, N.J., was awarded a Silver Medal for a particularly unique form of *Cattleya Trianæ* under the varietal name of Clinkaberryana.

February 5 a unique display of Orchids was made by Oakes Ames, for which the first prize was awarded. Violets were shown in perfection by David Nevins and William C. Winter.

February 12 William Wallace Lunt was awarded a First Class Certificate of Merit for the new Cypripedium bearing his name.

March 12 R. & J. Farquhar & Co. showed a new Narcissus, var. Victoria; a very desirable, large-flowered kind, of which Honorable Mention was made. On this date Hon. C. G. Roebling was awarded a Silver Medal for *Cypripedium Rothschildianum*, Trenton variety.

SPRING EXHIBITION.

March 22 and 23.

The Spring Exhibition brought very close competition in forced Roses and Carnations. Particularly fine vases of Bridesmaid and The Bride Roses were shown, the prizes being competed for by William H. Elliott and Robert McGorum. Carnations and Violets were never shown to better advantage, and the prizes were closely competed for.

RHODODENDRON SHOW.

June 7 and 8 (postponed from June 2 and 3).

The Rhododendron Exhibition, owing to the coolness of the season, was postponed from June 2 and 3 to June 7 and 8, at which time a very creditable exhibition was made, although the competition was not as sharp as has been the case in former years. H. H. Hunnewell made a most remarkable exhibit of a great many varieties, occupying an entire table. Other principal exhibitors were James Comley and Dr. C. G. Weld. At this show a particularly fine display of Hybrid Aquilegias was made by Frederick S. Davis.

PÆONY SHOW.

June 18 (postponed from June 11).

The Pæony Exhibition was, of necessity, postponed from June 11 until June 18, at which time a most remarkable display was

made in the classes called for. Competition was very sharp, and altogether this proved one of the most interesting exhibitions of the year. Dr. C. G. Weld, T. C. Thurlow, and George Hollis were the principal competitors. R. & J. Farquhar & Co. made a particularly effective display of Hybrid Pyrethrums, for which a Silver Medal was granted. *Philadelphus Lemoinei*, a new hardy shrub exhibited by T. C. Thurlow, was awarded a First Class Certificate of Merit.

ROSE EXHIBITION.

June 23 and 24.

The Rose Exhibition of June 23 and 24, owing to weather conditions, proved quite disappointing. Many exhibitors, who under ordinary conditions would have competed closely, were unable to make entries. The peculiar conditions of weather that prevailed made it impossible for the Committee to judge as to the postponement of the exhibit to a later date, and it is doubtful whether any postponement would have improved matters, as cool weather and abundant rains, preceded by a very sharp hot spell, made conditions anything but favorable for the production of first-class roses. At this exhibition Robert Laurie, of Newport, R.I., exhibited a vase of Chrysanthemum Independence, which attracted attention, particularly on account of its abnormal season of bloom. He also made a display of Fringed Begonias, which combined a great range of color with form and size of bloom.

July 2 W. W. Lunt was awarded a First Class Certificate of Merit for a beautiful form of *Dendrobium thyrsiflorum* under the varietal name of *Hinghamense*. Hon. C. G. Roebling was also awarded a First Class Certificate of Merit for *Lælio-Cattleya Canhamiana alba*.

Hollyhocks were not in condition to show on July 7, and subsequent exhibitions of these flowers were not up to the usual standard.

Tuberous Begonias were shown to very good advantage on July 16, and competition was close between E. S. Converse and James L. Little.

The exhibition of Sweet Peas on July 23 was well staged and showed great improvement in variety over years past. The

flowers were in good condition, the competition was close, and altogether the general effect was all that could be desired.

Perennial Phloxes in the exhibition of July 30 were well shown and a continued improvement was noted in this class.

August 6 Rea Brothers made a particularly creditable show of *Veronica longifolia* var. *subsessilis*, which proves to be one of our hardiest perennials, combining sturdy habit of growth with prolific bloom of a particularly rich shade of blue. Gladioli were principally shown by J. Warren Clark, in well-grown spikes displayed to the best advantage.

EXHIBITION OF AQUATIC PLANTS AND FLOWERS.

August 20.

The Aquatic Exhibition on August 20 was confined mainly to a display made by Henry A. Dreer, of Philadelphia, who took the first prize in both entries. James Comley displayed a new Hybrid Magnolia, a cross between *Magnolia grandiflora* and *M. Soulangeana* (?), resulting in a form with evergreen foliage and a very large, intensely fragrant ivory-white flower. For this was awarded a Silver Medal. Henry A. Dreer was awarded a First Class Certificate of Merit for Cannas and Petunias; and the same for *Nymphæa Gladstoniana.*

August 27 J. Warren Clark was awarded Honorable Mention for a particularly effective yellow variety of Gladiolus, named Yellow Bird, and on this date he also made a creditable exhibition of other Gladioli.

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

August 31 and September 1.

The exhibition of Dahlias at the Annual Show proved one of the most interesting of the year. Competition was very close, all classes being entered, and the merit of the individual flowers was all that could be desired. The exhibition attracted a great deal of attention and proved the Dahlia to be rising in popularity.

September 1 Jackson Dawson was awarded Honorable Mention for *Polygonum compactum*, a particularly desirable species, worthy of attention by cultivators in general.

September 10 Henry A. Dreer, of Philadelphia, was granted Honorable Mention for *Nymphæa Heusteriana*, a very promising new form.

September 17 George McWilliam was awarded Honorable Mention for a new seedling Dipladenia, Elsa Whitin. At the same time, and also on September 24 and October 1, Lothrop & Higgins made displays of Dahlias in various classes which were particularly well staged, showing a remarkable collection of varieties, and indicating the peculiar character and value of this class.

October 15 Hon. C. G. Roebling, of Trenton, N.J., was granted a Silver Medal for a unique and beautiful Orchid, *Dendrobium Phalænopsis* var. *Hololeuca;* also a First Class Certificate of Merit for *Cattleya labiata* var. *alba.*

October 29 Jackson Dawson was awarded a Silver Medal for *Euonymus Bungeanus*, which proves to be a most remarkable small, hardy tree, — the most remarkable that has been brought to the Hall for several years past. It is perfectly hardy, forming a large bush or small tree with slender branches which are quite enveloped with innumerable orange-red fruits with pink pericarps. Mr. Dawson also received the award of a First Class Certificate of Merit for *Ribes fasciculatum* var. *Chinensis*, a low bush with an abundance of the brightest cardinal-colored fruits.

R. & J. Farquhar & Co. exhibited a new double pink variety of *Anemone Japonica*, for which Honorable Mention was awarded.

CHRYSANTHEMUM EXHIBITION.

November 8, 9, 10, and 11.

While it would seem that in the last few years Chrysanthemum culture had reached its highest excellence, the present year proved that improvements have been made over the past. The specimen flowers were the finest that have ever been seen in our Hall, and altogether the Exhibition was a very marked success. It is very true that there was less competition in some of the classes than in past years, yet the entry into the field of new competitors shows that interest is not lacking and that future years will not fail to call forth close competition. The exhibitors were placed to some disadvantage by the early opening of the Hall, and it has been suggested that the opening hour of the first

day be set forward in order to give the exhibitors more time. The vases, in consequence of lack of time, were not as effective the first day as has been the case in other years. This matter was remedied later during the exhibition. The perfection to which specimen blooms have been brought, by careful cultivation, is marvellous, yet it seems that the principal exhibitors are still looking forward to additional laurels and great improvements in future years. These efforts on the part of our successful competitors will be watched with interest by your Committee, as well as by the public in general. At this exhibition Ernst G. Asmus, of West Hoboken, N.J., showed a large vase of the new Rose, Liberty, which created a great deal of enthusiasm, and seems particularly promising from its perfect shape, its intense color, and rich fragrance. Altogether, the indications are that this rose will prove exceedingly popular when introduced to the market.

November 19 Mr. George McWilliam exhibited a collection of seedling Dipladenias showing a great range of color in this valuable greenhouse plant, which would seem very promising for future use. A Silver Medal was given for the collection.

Native Plants.

Native plants were shown in unusual abundance by a number of competitors during the spring, summer, and autumn. Competition was very close — so close that at many times your Committee had to weigh their decisions with great care. A marked improvement is visible in the staging of the exhibits and the merits of the individual vases, as well as in the arrangement of the displays. Many rare plants were shown that were interesting from a botanical standpoint, and the best of the showy natives were not overlooked in any way. Competition has been more close in this particular class than in any other, and while the judgment of the Committee has been taken to task quite seriously by some of the exhibitors, absolute honesty in judgment has been the effort of your Committee.

Hardy Herbaceous Perennials.

These have not been shown to the same extent as in past years. It would seem particularly unfortunate that this has been the

case. The class is worthy of the greatest attention, as it includes some of the most effective plants of the garden. Their perennial character makes them especially desirable, while their effectiveness will bear comparison with any other class. Though the interest seems to have lessened from a competitive standpoint, yet we believe that this will be temporary and that other years will see a revival of active competition amongst exhibitors.

The amount appropriated for the year 1898 was .	$2,668 00
Awards of Prizes and Gratuities have been made to the amount of	2,065 00
Leaving an unexpended balance of	$603 00

Out of which medals, etc., are to be paid for.

All of which is respectfully submitted by your Committee.

J. WOODWARD MANNING, *Chairman.*

PRIZES AND GRATUITIES AWARDED FOR FLOWERS.

1898.

JANUARY 8.

CHINESE PRIMROSES. — Display of fifty or more individual blooms:	
First, Joseph H. White	$2 00
Second, W. E. Coburn	1 00
FREESIAS. — Vase of fifty spikes:	
First, W. N. Craig	2 00
Second, Mrs. E. M. Gill	1 00

JANUARY 15.

Gratuities: —

Oakes Ames, collection of *Cattleya Trianæ*	4 00
James Comley, Display of Flowers	3 00

JANUARY 22.

Gratuity: —

James L. Little, *Bignonia diversifolia*	1 00

JANUARY 29.

Gratuity: —

James Comley, Display of Flowers	2 00

FEBRUARY 5.

ORCHIDS. — Display of named species and varieties, filling not less than twenty bottles:	
First, Oakes Ames	15 00
VIOLETS. — Best collection of varieties, fifty blooms of each in a bunch:	
First, David Nevins	4 00
Third, William C. Winter	2 00
CARNATIONS. — Display of cut blooms, with foliage, not less than six varieties, in vases:	
First, William Nicholson	8 00
Second, M. A. Patten	6 00
CAMELLIAS. — Display of named varieties, cut flowers with foliage, not less than twelve blooms of not less than six varieties:	
First, James Comley	4 00
Second, James Comley	3 00

Gratuities: —

James Comley, two pans of *Cœlogyne cristata*	2 00
E. A. & W. K. Wood, Display of Carnations	1 00
Mrs. E. M. Gill, Display of Flowers	2 00
C. E. Richardson, " " "	1 00

FEBRUARY 12.

Gratuity: —

James Comley, Display of Flowers	2 00

FEBRUARY 19.

Gratuities: —

James Comley, Display of Flowers	2 00
Mrs. E. M. Gill, " " "	1 00

FEBRUARY 26.

Gratuity: —

James Comley, Display of Flowers	1 00

MARCH 5.

Gratuity: —

Mrs. E. M. Gill, Display of Flowers	1 00

MARCH 12.

Gratuities: —

James Comley, Display of Flowers	5 00
Mrs. P. D. Richards, Native Plants	1 00

MARCH 19.

Gratuities: —

Edward Butler, Display of Orchids	1 00
Mrs. P. D. Richards, Native Plants	1 00

SPRING EXHIBITION.

MARCH 22, 23, 24, AND 25.

HYBRID PERPETUAL ROSES. — Twelve blooms, of not less than four named varieties:

First, C. H. Souther	12 00
Second, David Nevins	10 00
Six blooms, not less than three named varieties:	
First, David Nevins	6 00
Second, C. H. Souther	5 00
Twelve blooms of Ulrich Brunner:	
First, David Nevins	10 00
TENDER ROSES IN VASES. — Twenty-five blooms of Bridesmaid:	
First, William H. Elliott	12 00
Second, Robert McGorum	10 00
Twenty-five blooms of The Bride:	
First, William H. Elliott	12 00
Second, Robert McGorum	10 00

CARNATIONS. — Vase of one hundred cut blooms, with foliage, not less than six varieties:

First, M. A. Patten	8 00
Twenty-five blooms of any named Crimson variety:	
First, E. A. & W. K. Wood, for Ferdinand Mangold	3 00
Twenty-five blooms of any named Dark Pink variety:	
First, M. A. Patten, for William Scott	3 00
Second, E. A. & W. K. Wood, for William Scott	2 00
Twenty-five blooms of any named Light Pink variety:	
First, William Nicholson, for Daybreak	3 00
Second, E. A. & W. K. Wood, for Daybreak	2 00
Twenty-five blooms of any named Scarlet variety:	
First, F. A. Blake, for Bon Ton	3 00
Second, J. Tailby & Sons, for Wellesley	2 00
Twenty-five blooms of any named White variety:	
First, E. A. & W. K. Wood, for Uncle John	3 00
Second, M. A. Patten, for Edith Foster	2 00
Twenty-five blooms of any White Variegated variety:	
First, M. A. Patten, for Mrs. G. M. Bradt	4 00

PANSIES. — Forty-eight cut blooms, not less than twenty-four varieties, in flat dishes:

First, Estate of Joseph S. Fay	3 00
Second, C. H. Souther	2 00

VIOLETS. — Bunch of one hundred blooms of California:

First, David Nevins	3 00
Second, Harry S. Rand	2 00
Bunch of one hundred blooms of Lady Hume Campbell:	
First, David Nevins	3 00
Bunch of one hundred blooms of Marie Louise:	
First, David Nevins	3 00
Second, Harry S. Rand	2 00
Bunch of one hundred blooms of any other double variety:	
First, David Nevins, for Farquhar	3 00
Second, David Nevins, for Swanley White	2 00

ANTIRRHINUMS. — Display, not less than three varieties:

First, Mrs. John Jeffries	3 00
Second, Charles H. Souther	2 00

Gratuities: —

David Nevins, Display of Roses	10 00
Estate of Joseph S. Fay, Display of Pansies	1 00
F. W. Fletcher, Display of Violets	1 00
James Comley, Display of Flowers	10 00
James Garthley, " " "	3 00
Mrs. E. M. Gill, " " "	2 00

APRIL 2.

Gratuities:—

James Comley, Display of Flowers	2 00
Mrs. P. D. Richards, Native Plants	1 00

APRIL 9.

Gratuity:—

Mrs. P. D. Richards, Native Plants	1 00

APRIL 16.

Gratuity:—

Mrs. E. M. Gill, Display of Flowers	1 00

APRIL 23.

Gratuities:—

James Comley, Display of Flowers	2 00
Mrs. P. D. Richards, Display of Native Plants	1 00

APRIL 30.

Gratuity:—

Edward J. Mitton, Gloxinias	2 00

MAY EXHIBITION.

MAY 7.

TULIPS. — Forty-eight blooms, not less than twelve named varieties:

First, W. N. Craig	4 00
Second, Henry A. Wheeler	2 00

HARDY NARCISSUSES. — Collection of fifty vases of not less than ten named varieties:

First, Dr. C. G. Weld	8 00
Second, W. N. Craig	6 00

PANSIES. — Forty-eight blooms, not less than twenty-four varieties, in flat dishes

First, Estate of Joseph S. Fay	4 00
Second, Estate of Joseph S. Fay	3 00
Third, Estate of Joseph S. Fay	2 00

NATIVE PLANTS. — Collection of thirty bottles of named species and varieties, one bottle of each:

First, Mrs. P. D. Richards	8 00
Second, Misses Eleanor A. and Mollie S. Doran	6 00
Third, Miss Genevieve Doran	4 00

Gratuities:—

William S. Eager, Display of Carnation Nivea	2 00
J. S. Bailey, Display of Carnation Daybreak	1 00
W. N. Craig, Display of Carnations and Pelargoniums	1 00

Estate of Joseph S. Fay, Display of Pansies	2 00
John Jeffries, Display of Antirrhinums	1 00
Rea Brothers, Display of *Primula acaulis hybrida*	1 00
James Comley, Display of Flowers	3 00
Dr. C. G. Weld, " " "	3 00
Mrs. E. M. Gill, " " "	2 00
Miss Vivien May Norris, Native Plants	1 00
Joseph Anderson, " "	1 00

MAY 14.

Gratuities: —

Estate of Joseph S. Fay, Display of Pansies	5 00
James Comley, Display of Flowers	4 00
Mrs. E. M. Gill, " " "	2 00
Mrs. P. D. Richards, Native Plants	3 00
R. M. Puroes, " "	1 00

MAY 21.

HARDY PRIMULAS. — Display:

Second, Oakes Ames	2 00

Gratuities: —

J. S. Bailey, Display of Orchids	3 00
C. H. Souther, Gloxinias	2 00
James Comley, Display of Flowers	5 00
Mrs. E. M. Gill, " " "	2 00
Rea Brothers, " " "	2 00
H. A. Wheeler, " " "	1 00
Mrs. P. D. Richards, Native Plants	2 00

MAY 28.

Gratuities: —

Miss Vivien May Norris, Native Plants	2 00
Mrs. P. D. Richards, " "	2 00

JUNE 4.

Gratuity: —

H. H. Hunnewell, Display of Rhododendrons	8 00

RHODODENDRON EXHIBITION.

JUNE 7 AND 8 (POSTPONED FROM JUNE 2 AND 3).

H. H. Hunnewell Fund.

RHODODENDRONS. — Twelve distinct varieties of unquestioned hardiness, named:

First, James Comley	20 00

Six distinct varieties of unquestioned hardiness, named:

First, Dr. C. G. Weld	10 00

Single truss of any tender variety, named:

First, Dr. C. G. Weld	2 00

HARDY AZALEAS, FROM ANY OR ALL CLASSES. — Fifteen varieties, one vase of each:

First, James Comley	8 00
Second, Thomas C. Thurlow	5 00
Twelve varieties, one vase of each:	
Second, T. C. Thurlow	3 00
Six varieties, one vase of each:	
First, John L. Gardner	3 00
Cluster of trusses, one variety:	
First, T. C. Thurlow	2 00

Society's Prizes.

PÆONIA OFFICINALIS. — Collection of named varieties:	
First, T. C. Thurlow	6 00
TREE PÆONIES. — Collection of single and double varieties, named:	
First, T. C. Thurlow	6 00
GERMAN IRISES. — Fifty single blooms of not less than twelve varieties:	
First, John L. Gardner	4 00
ORIENTAL POPPIES. — Display:	
First, W. N. Craig	3 00
AQUILEGIAS. — Collection, twenty-five vases:	
First, Frederick S. Davis	3 00
Second, Joseph H. White	2 00
Third, Oakes Ames	1 00
HARDY ORNAMENTAL TREES AND SHRUBS. — Display of not less than thirty species and varieties, named, cut blooms or foliage:	
First, N. T. Kidder	8 00
Second, James Comley	6 00
Third, T. C. Thurlow	4 00
NATIVE PLANTS. — Collection of thirty bottles of named species and varieties, one bottle of each:	
First, George H. Grinnell	8 00
Second, Mrs. P. D. Richards	6 00
Third, Miss Genevieve Doran	4 00
VASE OF FLOWERS:	
First, Mrs. E. M. Gill	4 00
Second, Miss Hattie B. Winter	3 00

Gratuities: —

H. H. Hunnewell, Display of Rhododendrons and Azaleas	25 00
Mrs. A. W. Blake, Display of Azaleas and Rhododendrons	5 00
James Comley, Display of Rhododendrons	5 00
James Comley, Display of Rhododendrons, etc.	5 00
Joseph H. White, Display of Gloxinias	3 00
Dr. C. G. Weld, Display of Flowers	6 00
Mrs. E. M. Gill, " " "	3 00

John L. Gardner, Display of Flowers	2 00
W. N. Craig, " " "	2 00
W. A. Manda, " " "	2 00
Rea Brothers, Display of Hardy Flowers	3 00
Miss Vivien May Norris, Display of Native Plants arranged for Effect,	4 00

JUNE 11.

Gratuities: —

Rea Brothers, Hardy Perennials	6 00
James Comley, Display of Flowers	10 00
Mrs. A. W. Blake, " " "	2 00
Mrs. E. M. Gill, " " "	2 00

PÆONY EXHIBITION.

JUNE 18 (POSTPONED FROM JUNE 11).

HERBACEOUS PÆONIES. — Collection of named varieties, double:	
First, T. C. Thurlow	12 00
Second, Dr. C. G. Weld	10 00
Third, George Hollis	8 00
Collection of named varieties, single:	
First, T. C. Thurlow	6 00
Second, George Hollis	5 00
Specimen Bloom:	
First, Dr. C. G. Weld, for Model of Perfection	2 00
Second, Dr. C. G. Weld, for Blanche Neige	1 00
Vase of Blooms on long stems, arranged for effect in the Society's large china vases:	
First, Dr. C. G. Weld	10 00
Second, George Hollis	8 00
Third, Mount Vernon Nursery	6 00
FOXGLOVES. — Twelve spikes:	
First, John L. Gardner	3 00
Second, Miss M. S. Walker	2 00
Third, W. N. Craig	1 00

Gratuities: —

Mrs. David Low, Display of Pæonies	1 00
Estate of Joseph S. Fay, Display of Rhododendrons	3 00
Mrs. E. M. Gill, Display of Roses	3 00
William H. Spooner, " " "	2 00
William Nicholson, Display of Carnations	3 00
Rea Brothers, Display of Pyrethrums	1 00
John L. Gardner, Display of Foxgloves	1 00
Rea Brothers, Display of Herbaceous Perennials	3 00

James Comley, Display of Flowers	12 00
W. N. Craig, " " "	3 00
Oakes Ames, " " "	2 00
Mrs. A. W. Blake, " " "	2 00
Mrs. E. M. Gill, " " "	2 00
G. L. Clarke, " " "	1 00
Mrs. P. D. Richards, Display of Native Plants	2 00
Miss Genevieve Doran, " " " "	1 00

ROSE EXHIBITION.

JUNE 23 AND 24.

Special Prizes, Theodore Lyman Fund.

HARDY ROSES. — Twenty-four distinct named varieties, three of each variety:

First, Estate of Joseph S. Fay	25 00

Society's Prizes.

Sixteen named varieties, three of each variety:	
First, Estate of Joseph S. Fay	15 00
Twelve named varieties, three of each:	
First, Joseph H. White	10 00
Second, Dr. O. S. Paige	3 00
Six named varieties, three of each:	
First, Estate of Joseph S. Fay	6 00
Second, Mrs. A. W. Blake	4 00
Three named varieties, three of each:	
First, Joseph H. White	3 00
Second, Estate of Joseph S. Fay	2 00
Twenty-four named varieties, one of each:	
First, Dr. O. S. Paige	10 00
Second, Estate of Joseph S. Fay	8 00
Eighteen named varieties, one of each:	
First, Joseph H. White	8 00
Second, Estate of Joseph S. Fay	6 00
Twelve named varieties, one of each:	
First, Dr. C. G. Weld	6 00
Second, Joseph H. White	4 00
Third, Estate of Joseph S. Fay	2 00
Six named varieties, one of each:	
First, E. S. Converse	4 00
Second, Joseph H. White	3 00
Third, Estate of Joseph S. Fay	2 00
Twenty-four blooms of Mme. Gabriel Luizet:	
First, Estate of Joseph S. Fay	8 00
Second, Dr. O. S. Paige	6 00

Six blooms of Baroness Rothschild:

First, Mrs. A. W. Blake	3 00
Second, Dr. O. S. Paige	2 00

Six blooms of John Hopper:

Second, Dr. O. S. Paige	2 00

Twelve blooms of any other variety:

First, Dr. O. S. Paige	4 00
Second, Dr. C. G. Weld	3 00

Best single bloom of any variety:

First, Dr. O. S. Paige	2 00

Moss Roses. — Six named varieties, three clusters of each:

First, John L. Gardner	3 00
Second, Dr. C. G. Weld	2 00

General Display. — One hundred bottles of Hardy Roses, buds admissible, each exhibitor limited to one entry:

First, Mrs. E. M. Gill	10 00
Second, W. N. Craig	9. 00
Third, Mrs. B. P. Cheney	8 00
Fourth, Dr. O. S. Paige	7 00
Fifth, Miss M. S. Walker	6 00
Sixth, John L. Gardner	5 00

Basket of Roses. — Arranged for effect, to be shown the second day:

First, Mrs. E. M. Gill	5 00

Sweet Williams. — Thirty spikes, not less than six varieties:

First, W. N. Craig	4 00
Second, Miss M. S. Walker	3 00
Third, Mrs. A. W. Blake	2 00

Spanish Irises. — Display:

First, John Jeffries	3 00
Second, Walter H. Cowing	2 00

Vase of Flowers. — Best arranged:

First, Mrs. E. M. Gill	5 00
Second, Miss Hattie B. Winter	4 00

Gratuities: —

Estate of Joseph S. Fay,	Display of Roses	10 00
Mrs. E. M. Gill,	" " "	3 00
William H. Spooner,	" " "	2 00
Oakes Ames, Sweet Williams		1 00
T. C. Thurlow,	Display of Pæonies	5 00
George Hollis,	" " "	4 00
Estate of Joseph S. Fay,	" " "	3 00
T. C. Thurlow,	" " "	1 00
Robert Laurie,	Display of Fringed Begonias	5 00
W. E. Coburn,	Display of Pelargoniums	1 00
John Jeffries,	Foxgloves	1 00

Robert Laurie, Chrysanthemum Independence	1 00
W. N. Craig, Display of Flowers	6 00
James Comley, " " "	5 00
A. F. Estabrook, " " "	2 00
James Comley, Vase of Flowers	5 00
Rea Brothers, Hardy Flowers	2 00
Miss Vivien May Norris, Native Grasses	1 00
Mrs. P. D. Richards, Native Flowers	1 00

JULY 2.

IRIS KÆMPFERI. — Fifteen varieties, three of each, in vases:	
First, John L. Gardner	6 00
Six varieties, three of each, in vases:	
First, John L. Gardner	4 00
Second, Miss M. S. Walker	3 00
CAMPANULA MEDIUM. — Collection, not less than fifteen bottles:	
First, John L. Gardner	5 00
SWEET WILLIAMS. — Auricula-flowered, thirty spikes, of not less than six distinct varieties:	
Second, W. N. Craig	2 00
DELPHINIUMS. — Collection of twenty spikes, not less than five varieties:	
First, John L. Gardner	5 00
Second, Mrs. A. W. Blake	4 00
Third, Rea Brothers	3 00
HERBACEOUS PLANTS. — Thirty bottles:	
First, W. N. Craig	8 00
Second, Rea Brothers	6 00
Third, George L. Clark	4 00
VASE OF FLOWERS. —	
First, Miss Hattie B. Winter	4 00
Second, Mrs. E. M. Gill	3 00

Gratuities: —

Mrs. B. P. Cheney, Display of Roses	3 00
Mrs. B. P. Cheney, Display of Gloxinias	3 00
George Hollis, Display of Geraniums	2 00
James Comley, Display of Flowers	8 00
W. N. Craig, " " "	2 00
Mrs. E. M. Gill, " " "	2 00
Miss Genevieve Doran, Display of Native Plants	2 00

JULY 9.

HOLLYHOCKS. — Single, twelve spikes:	
Second, John L. Gardner	3 00

NATIVE PLANTS. — Collection, not exceeding forty bottles of named species and varieties, one bottle of each:

First, Mrs. W. S. Eager	8 00
Second, Misses Eleanor A. and Mollie S. Doran	6 00
Third, Miss Genevieve Doran	4 00

VASE OF FLOWERS. — Best arranged:

First, Miss Hattie B. Winter	4 00
Second, Mrs. E. M. Gill	3 00

Gratuities: —

E. Shepperd & Son, Display of Irises	1 00
R. & J. Farquhar & Co., Display of Lilies and Irises	2 00
W. N. Craig, Display of Phloxes and Roses	2 00
Rea Brothers, Display of Herbaceous Plants	2 00
Mrs. A. W. Blake, Display of Flowers	1 00
Miss Vivien May Norris, Native Plants	4 00

JULY 16.

TUBEROUS BEGONIAS. — Collection arranged with their own foliage, in flat dishes:

First, E. S. Converse	4 00
Second, James L. Little	3 00
Third, James L. Little	2 00

HARDY FERNS. — Collection of named species and varieties:

First, Miss Alice L. Grinnell	6 00

Gratuities: —

John L. Gardner, Display of Hollyhocks	4 00
E. C. Lewis, " " "	1 00
W. N. Craig, Hollyhocks and Sweet Peas	3 00
R. & J. Farquhar & Co., Display of Lilies	4 00
James L. Little, Display of Gloxinias	3 00
Rea Brothers, Display of Hardy Perennials	1 00
Mrs. E. M. Gill, Display of Flowers	3 00
E. Sheppard & Sons, " " "	1 00
Misses Eleanor A. and Mollie S. Doran, Native Plants	2 00
Miss Alice L. Grinnell, Native Plants	1 00

JULY 23.

SWEET PEAS. — Display of named varieties, filling thirty vases, arranged with their foliage:

First, H. B. Watts	6 00
Second, F. A. Blake	4 00
Third, F. E. Chaffin	3 00

Display of named varieties in vases, six sprays in each vase:

First, H. B. Watts	4 00
Second, F. A. Blake	3 00
Third, W. H. Harrison	2 00

HERBACEOUS PLANTS. — Thirty bottles:

First, W. N. Craig	8 00
Second, Rea Brothers	6 00

VASE OF FLOWERS. — For table decoration:

First, Mrs. E. M. Gill	4 00
Second, Miss Hattie B. Winter	3 00

Gratuities: —

A. S. Messer, Display of Hollyhocks	3 00
George Hollis, *Convolvulus palmata*	1 00
W. N. Craig, Display of Flowers	2 00
E. C. Lewis, " " "	2 00
Miss Alice L. Grinnell, Native Plants	1 00

JULY 30.

PERENNIAL PHLOXES. — Twelve named varieties, one spike of each:

First, Rea Brothers	3 00
Second, George Hollis	2 00

ANTIRRHINUMS. — Display of thirty vases, not less than ten varieties, three spikes of each:

First, William H. Lincoln	4 00
Second, John Jeffries	3 00

NATIVE FLOWERS. — Collection, not exceeding forty bottles of named species and varieties, one bottle of each:

First, Mrs. W. S. Eager	8 00
Second, Mrs. P. D. Richards	6·00
Third, Miss Genevieve Doran	4 00

Gratuities: —

T. C. Thurlow, Phlox	2 00
John L. Gardner, Display of Flowers	3 00
Rea Brothers, " " "	2 00
James Comley, " " "	1 00
Mrs. E. M. Gill, " " "	1 00

AUGUST 6.

ANNUALS. — General display, named, filling not less than one hundred and fifty bottles:

First, John L. Gardner	10 00

Gratuities: —

Mrs. E. M. Gill, Display of Annuals	2 00
Rea Brothers, Display of *Veronica longifolia subsessilis*, Phlox, etc.,	4 00
R. & J. Farquhar & Co., Display of Auratum Lilies	3 00
E. S. Converse, Display of Tuberous Begonias	1 00
Mrs. P. D. Richards, Display of Native Plants	3 00
Miss Alice L. Grinnell, " " " "	2 00

AUGUST 13.

GLADIOLI. — Ten named varieties, in spikes:

First, J. Warren Clark	3 00
Second, John L. Gardner	2 00
Six varieties, named, in spikes:	
First, J. Warren Clark	2 00
Display of named and unnamed varieties, filling one hundred vases, arranged for effect, with any foliage:	
First, J. Warren Clark	8 00
MONTBRETIA. — Display in vases:	
First, Bussey Institution	3 00
Second, John L. Gardner	2 00
PERENNIAL PHLOXES. — Collection of eighteen named varieties:	
First, George Hollis	4 00
Second, Rea Brothers	3 00
Third, T. C. Thurlow	2 00

Gratuities: —

T. C. Thurlow, Display of Phlox	2 00
James Comley, Display of Flowers	3 00
R. P. Struthers, " " "	1 00
Mrs. E. A. Wilkie, " " "	1 00
Miss Alice L. Grinnell, Display of Native Plants	4 00
Misses Eleanor A. and Mollie S. Doran, Display of Native Plants	3 00
Mrs. P. D. Richards, Display of Native Plants	2 00

EXHIBITION OF AQUATIC PLANTS AND FLOWERS.

AUGUST 20.

Theodore Lyman Fund.

AQUATICS. — General display of Nymphæas, Nelumbiums, Sedges, Papyrus, and other aquatic plants, arranged for effect, to include not less than twenty-five blooms of Nymphæas:

First, Henry A. Dreer, Philadelphia	40 00
Display of twelve Nymphæas and Nelumbiums, named:	
First, Henry A. Dreer	8 00
ASTERS. — Large Flowered, of all classes, fifty vases, not less than twelve varieties, three flowers in each vase:	
First, C. H. Souther	6 00
Second, John L. Gardner	5 00
Truffaut's Pæony Flowered Aster, thirty blooms, not less than twelve varieties:	
First, C. H. Souther	4 00
Victoria Flowered, thirty blooms, not less than twelve varieties:	
First, C. H. Souther	4 00
Third, Mrs. A. W. Blake	2 00

HERBACEOUS PLANTS. — Thirty bottles:

First, W. N. Craig	8 00

Gratuities: —

J. Warren Clark, Display of Gladioli	3 00
William C. Winter, Display of Dahlias	2 00
John Parker, " " "	1 00
George Hollis, Collection of Phloxes	2 00
Rea Brothers, " " "	2 00
W. N. Craig, Cannas and Gloxinias	2 00
Bussey Institution, *Montbretia crocosmiflora*	1 00
James Comley, Display of Flowers	1 00
Miss Alice L. Grinnell, Native Plants	3 00
Mrs. P. D. Richards, " "	3 00
Misses Eleanor A. and Mollie S. Doran, Native Plants	1 00

AUGUST 27.

Gratuities: —

J. Warren Clark, Display of Gladioli	1 00
James Comley, Display of Flowers	2 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

AUGUST 31 AND SEPTEMBER 1.

DAHLIAS. — Show, eighteen blooms, named varieties:

First, H. F. Burt	4 00
Second, William C. Winter	3 00
Fancy, eighteen blooms, named varieties:	
First, H. F. Burt	4 00
Cactus, twelve blooms, named varieties:	
First, Lothrop & Higgins	4 00
Decorative, twelve blooms, named varieties:	
First, Lothrop & Higgins	4 00
Show, six blooms, named varieties:	
First, Lothrop & Higgins	2 00
Second, H. F. Burt	1 00
Fancy, six blooms, named varieties:	
First, H. F. Burt	2 00
Second, H. F. Burt	1 00
Best single bloom of any class, introduction of 1896, or later:	
Lothrop & Higgins	1 00
Pompon, twelve vases of three blooms each, named varieties:	
First, L. W. Snow	3 00
Second, William C. Winter	2 00
Third, H. F. Burt	1 00

General Display, all classes admissible, one hundred or more bottles:

First, W. W. Rawson & Co.	12 00
Second, William C. Winter	10 00
Third, Lothrop & Higgins	8 00
Fourth, H. F. Burt	6 00

HARDY LILIES. — Collection of named varieties:

First, Sumner Coolidge	4 00

TROPÆOLUMS. — Display, with their own foliage, filling twenty-five vases, not over twelve blooms of one variety in each:

First, Dr. C. G. Weld	3 00
Second, James L. Little	2 00

DOUBLE ZINNIAS. — Fifty flowers, not less than twelve varieties:

First, Dr. C. G. Weld	3 00
Second, James Comley	2 00

NATIVE PLANTS. — Collection, not exceeding forty bottles, of named species and varieties, one bottle of each:

First, Misses Eleanor A. and Mollie S. Doran	8 00
Second, Mrs. P. D. Richards	6 00
Third, Mrs. W. S. Eager	4 00

VASE OF FLOWERS. — For table decoration, on the last day of the exhibition:

Second, Mrs. E. M. Gill	3 00
Third, Miss Hattie B. Winter	2 00

Gratuities: —

R. & J. Farquhar & Co., Display of Cannas	2 00
J. W. Howard, Display of Cannas	1 00
J. Warren Clark, Display of Gladioli	2 00
Dr. C. G. Weld, Display of Asters	1 00
James L. Little, Display of Begonias	1 00
Rea Brothers, Display of Hardy Perennials	2 00
James Comley, Display of Flowers	3 00
Mrs. E. M. Gill, " " "	1 00
Miss Alice L. Grinnell, Display of Native Plants	1 00

SEPTEMBER 3.

Gratuity: —

Robert Laurie, Tuberous Begonias	1 00

SEPTEMBER 10.

HERBACEOUS PLANTS. — Thirty bottles:

First, W. N. Craig	8 00
Second, Rea Brothers	6 00

Gratuities: —

Lothrop & Higgins, Display of Dahlias	1 00
L. W. Goodell, Display of Phlox and Zinnias	1 00

L. W. Goodell, Display of Nymphæas	2 00
Mrs. E. M. Gill, Display of Flowers	1 00

SEPTEMBER 17.

PERENNIAL ASTERS. — Collection of Native or Introduced species and varieties:

First, Mrs. P. D. Richards	5 00
Second, Mrs. E. M. Gill	4 00
Third, Misses Eleanor A. and Mollie S. Doran	3 00

Gratuities: —

Lothrop & Higgins, Display of Cactus and Decorative Dahlias	2 00
John F. Colan, *Celosia cristata*	1 00
James Comley, Display of Flowers	5 00
Rea Brothers, " " "	1 00

SEPTEMBER 24.

Gratuities: —

Lothrop & Higgins, Display of Show and Fancy Dahlias	2 00
Mrs. E. M. Gill, Display of Dahlias	1 00

OCTOBER 1.

Gratuity: —

Lothrop & Higgins, Display of Dahlias	4 00

OCTOBER 15.

Gratuities: —

William C. Winter, Display of Dahlias	2 00
Mrs. E. M. Gill, " " "	1 00

OCTOBER 29.

Gratuity: —

James Comley, Display of Flowers	2 00

CHRYSANTHEMUM SHOW.

NOVEMBER 8, 9, 10, AND 11.

Special Prizes.

Josiah Bradlee Fund.

CHRYSANTHEMUMS. — Twenty-five blooms of twenty-five distinct varieties, named, a piece of plate, or value in money:

First, Mrs. B. P. Cheney	20 00
Second, Robert Laurie, Newport, R.I.	15 00
Third, David Nevins	10 00

Six vases of six named varieties, ten blooms each:

First, Waban Conservatories	30 00
Second, Mrs. B. P. Cheney	26 00
Third, David Nevins	20 00

Society's Prizes.

Twelve cut blooms, Incurved, named, in vases:	
First, Joseph H. White	8 00
Second, C. H. Souther	6 00
Third, Dr. C. G. Weld	4 00
Twelve cut blooms, Japanese Incurved, named:	
First, C. H. Souther	10 00
Second, Mrs. B. P. Cheney	6 00
Third, N. T. Kidder	4 00
Twelve cut blooms, Anemone, named, in vases:	
First, C. H. Souther	8 00
Second, James L. Little	6 00
Third, Dr. C. G. Weld	4 00
Six cut blooms, Incurved, named, in vases:	
First, C. H. Souther	5 00
Second, Joseph H. White	4 00
Third, John Jeffries	2 00
Six cut blooms, Japanese, named, in vases:	
First, C. H. Souther	6 00
Second, Mrs. B. P. Cheney	4 00
Third, James L. Little	2 00
Six cut blooms, Japanese Incurved, named, in vases:	
First, Joseph H. White	6 00
Second, Mrs. B. P. Cheney	4 00
Third, Edwin Whitin	2 00
Six cut blooms, Anemone, named, in vases:	
First, E. S. Converse	5 00
Second, James L. Little	4 00
Third, John Shepherd	2 00
Twelve sprays, Pompons, naturally grown, stems twenty-four inches or over, not less than six named varieties:	
First, William C. Winter	4 00
Twelve best varieties, named, introductions of the current year:	
First, J. W. Howard	8 00
Vase of ten blooms, on long stems, Pink, named:	
First, David Nevins	10 00
Second, Robert Laurie	8 00
Third, Robert Laurie	6 00
Vase of ten blooms on long stems, Red, named:	
First, David Nevins	10 00
Second, Mrs. B. P. Cheney	8 00
Third, Alexander Frazer	6 00
Vase of ten blooms, on long stems, White, named:	
First, Waban Conservatories	10 00
Second, Mrs. B. P. Cheney	8 00
Third, David Nevins	6 00

Vase of ten blooms, on long stems, Yellow, named:

First, Waban Conservatories	10 00
Second, David Nevins	8 00
Third, Waban Conservatories	6 00

Vase of blooms on long stems, arranged in the Society's large china vases, to be kept in good condition during the exhibition:

First, David Nevins	20 00
Second, C. H. Souther	18 00
Fifth, Miss Eleanor J. Clark	12 00

Best Seedling, never disseminated, six blooms, White:

George Hollis, for Peerless	5 00

Best Seedling, never disseminated, six blooms, Yellow:

Ernst G. Asmus, for Mrs. Trenor L. Park	5 00

Gratuities:—

Mrs. E. M. Gill, Display of Chrysanthemums	8 00
Mrs. B. P. Cheney, " " "	7 00
Mrs. B. P. Cheney, " " "	4 00
James Comley, " " "	6 00
S. J. Goddard, " " "	4 00
James Garthley, " " "	2 00
John Jeffries, " " "	1 00
H. Dumaresq, Two Vases of Chrysanthemums	6 00
David Nevins, " " " "	5 00
William W. Edgar, Vase of Chrysanthemum Mrs. Weeks	2 00
J. Fuller, Chrysanthemum Wachusett	2 00
Peter Fisher, Vase of Carnation Mrs. Thomas Lawson	2 00
J. W. Howard, Seedling Carnations	3 00
S. J. Goddard, Display of Carnations	1 00
Carl Jurgens, Vase of Rose Kaiserin Augusta Victoria	2 00
Dr. C. G. Weld, Collection	5 00

NOVEMBER 26.

Gratuity:—

James Comley, Display of Chrysanthemums	1 00

DECEMBER 3.

Gratuities:—

Mrs. E. M. Gill, Display of Flowers	2 00
James Comley, " " "	1 00

DECEMBER 24.

Gratuity:—

George Hollis, Collection of Geraniums	1 00

SOCIETY'S SILVER MEDALS.

January 15. Oakes Ames, for *Cattleya Trianæ* Lilian Chatman.
" " Hon. C. G. Roebling, Trenton, N.J., for *Cattleya Trianæ* var. *Clinkaberryana.*
March 12. Hon. C. G. Roebling, for *Cypripedium Rothschildianum*, Trenton variety.
Spring Exhibition, March 22–25. Peter Fisher, for Carnation Mrs. Thomas Lawson.
June 18. R. & J. Farquhar & Co., for Pyrethrums.
August 20. James Comley, for new Hybrid Magnolia.
October 15. Hon. C. G. Roebling, for *Dendrobium Phalænopsis* var. *Hololeuca.*
October 29. Jackson Dawson, for *Euonymus Bungeanus.*
Chrysanthemum Show, November 8–11. Ernst G. Asmus, for Rose Liberty.
November 19. George McWilliam, for Dipladenia Elizabeth K. Whitin.

KELWAY SILVER GILT MEDAL.

Pæony Exhibition, June 18. Dr. C. G. Weld, for the best collection of eighteen named varieties of *Pæonia albiflora*, single or double.

KELWAY BRONZE MEDAL.

Pæony Exhibition, June 18. T. C. Thurlow, for second best collection of eighteen named varieties of *Pæonia albiflora*, single or double.

FIRST CLASS CERTIFICATES OF MERIT.

February 12. W. W. Lunt, for Cypripedium William Wallace Lunt.
April 23. James E. Rothwell, for Cypripedium Eleanor Rothwell.
May 7. Hon. C. G. Roebling, for *Cypripedium Lawrenceanum* var. *Hyeanum.*
May 14. R. & J. Farquhar & Co., for *Narcissus bicolor* var. Victoria.
June 18. T. C. Thurlow, for *Philadelphus Lemoinei.*
July 21. W. W. Lunt, for *Dendrobium thyrsiflorum* var. *Hinghamense.*
" " Hon. C. G. Roebling, for *Lælio-Cattleya Canhamiana alba.*
August 20. Henry A. Dreer, for Cannas and Petunias.
" " Henry A. Dreer, for *Nymphæa Gladstoniana.*
October 1. Lothrop & Higgins, for Cactus Dahlias.
October 15. Hon. C. G. Roebling, for *Cattleya labiata* var. *alba.*
October 29. Jackson Dawson, for *Ribes fasciculatum* var. *Chinensis.*
" " R. & J. Farquhar & Co., for Salvia Sapphire.
November 9. Hon. C. G. Roebling, for *Renanthera Lowii.*
December 3. Hon. C. G. Roebling, for *Cypripedium Sanderianum.*

HONORABLE MENTION.

February 12. Hon. C. G. Roebling, for *Cattleya Trianæ* var. Emily M. Roebling.
March 12. R. & J. Farquhar & Co., for *Narcissus bicolor* var. Victoria.

Spring Exhibition, March 22-25. Frank Niquet, for Carnation Maud Adams.
Rose and Strawberry Exhibition, June 23 and 24. Jackson Dawson, for Seedling Roses.
August 20. J. Warren Clark, for Seedling Gladioli.
" " J. Warren Clark, for *Gladiolus Nanceianus* Seedlings.
August 27. J. Warren Clark, for Gladiolus Yellow Bird.
Annual Exhibition of Plants and Flowers, August 31 and September 1. Jackson Dawson, for *Polygonum compactum*.
September 10. Oakes Ames, for Collection of Hardy Nymphæas.
" " Henry A. Dreer, Philadelphia, for *Nymphæa Heusteriana*.
September 17. George McWilliam, for Dipladenia Elsa Whitin.
October 29. R. & J. Farquhar & Co., for new double blush Anemone Japonica.
Chrysanthemum Show, November 8-11. John H. Taylor, for Rose Admiral Dewey.
November 8-11. John H. Dunlop, for Rose Lady Dorothea.

J. Woodward Manning,
Michael H. Norton,
Kenneth Finlayson,
Frederick S. Davis,
George E. Davenport,
} *Committee on Flowers.*

REPORT

OF THE

COMMITTEE ON FRUITS,

FOR THE YEAR 1898.

By E. W. WOOD, CHAIRMAN.

The fruit crop has been more evenly distributed among the different species the past season than usual. There has been no abundant crop of any kind except the strawberry, and there has been no marked failure of any of the varieties generally grown in this State.

Strawberries were evidently grown over a larger area than usual, and with favorable conditions the crop was so abundant that, excepting localities favorably situated as regarded markets, there was little or no profit to the growers. In a limited number of cases reported, where the receipts did not equal the expense for picking and marketing, the berries were not picked, but the vines were ploughed under, and the land utilized for other crops.

Reports from all parts of the State give the apple crop as yielding about forty-five per cent of the yearly average, this being the even or bearing year. There was a very full bloom on the trees, but the weather, while they were in blossom, was almost continually wet, and the set of fruit was scattering, and in some places an almost entire failure. While there was about half an average crop, the net receipts to the growers, owing to the higher prices received, were equal to those of 1896, when we had an exceedingly abundant crop, and the trees in many localities having received a rest the past year we may reasonably expect a larger crop of this fruit in 1899 than usual on the odd calendar year.

The exhibits during the year have been larger than usual, and the premiums were nearly all awarded.

No new varieties of fruits deserving special mention were shown, except in strawberries, where several varieties appeared for the first time, which upon further trial may prove desirable additions to those now in general cultivation. The increased exhibits of the Mackintosh apple indicate that it is coming into more general cultivation. It follows the Gravenstein and is a desirable market variety. Most of the fruit shown at the exhibitions is from those who grow for market, being selected specimens from ordinary orchard cultivation, comparatively few being grown specially for exhibition.

Sixteen hundred and seventy-five dollars have been awarded in prizes and gratuities, leaving an unexpended balance of fifty-seven dollars.

For the Committee,

E. W. WOOD,

Chairman.

PRIZES AND GRATUITIES AWARDED FOR FRUITS.

1898.

SPRING EXHIBITION.

March 22, 23, 24, and 25.

Winter Apples. — Baldwin:	
First, Mrs. A. W. Blake	$3 00
Second, C. L. Hartshorn	2 00
Third, George C. Rice	1 00
Northern Spy:	
First, William O'Connell	3 00
Second, George V. Fletcher	2 00
Roxbury Russet:	
First, H. R. Kinney	3 00
Second, Benjamin P. Ware	2 00
Third, C. L. Hartshorn	1 00
Tompkins King:	
First, George C. Rice	3 00
Any other variety:	
First, F. J. Kinney, Mackintosh	3 00
Second, George C. Rice, Fallawater	2 00
Third, C. L. Hartshorn, Rhode Island Greening	1 00
Winter Pears. — Any variety:	
First, George V. Fletcher, Anjou	3 00
Second, Warren Fenno, Duchess of Bordeaux	2 00
Strawberries. — One pint:	
First, E. S. Converse, Sharpless	3 00
Second, M. R. Cushing, Marshall	2 00

May 7.

Gratuities: —

William Brown, Peaches	2 00
William C. Winter, "	1 00
C. L. Hartshorn, Collection of Apples	2 00

May 14.

Gratuity: —

William Brown, Peaches	1 00

June 7.

Gratuities: —

E. S. Converse, Nectarines	1 00
William C. Winter, Grapes and Peaches	2 00

June 18.

Gratuities: —

William Doran & Son, Strawberries	2 00
W. N. Craig, "	1 00

ROSE AND STRAWBERRY EXHIBITION.

JUNE 23 AND 24.

Special Prizes from the Theodore Lyman Fund.

STRAWBERRIES. — Four quarts of any variety:

First, Warren Heustis & Son, for Marshall, the Lyman Plate, value	20 00
Second, Estate of Joseph S. Fay, for Marshall, the Lyman Plate, value	16 00
Third, A. M. Davenport, for Marshall, the Lyman Plate, value,	12 00
Fourth, Barnard Farm, " " " " " "	10 00
Fifth, Barnard Farm, for Clyde, the Lyman Plate, value	8 00

Special Prizes offered by the Society.

Two quarts of any variety, best adapted for garden cultivation for home use, to be judged by points:

First, Benjamin M. Smith, Margaret	6 00
Second, I. E. Coburn, Jessie	5 00
Third, Warren Heustis & Son, Marshall	4 00
Fourth, Estate of Joseph S. Fay, Marshall	3 00

Regular Prizes.

For the largest and best collection, not less than fifteen baskets of two quarts each, and not less than five varieties:

First, I. E. Coburn	20 00
Second, George F. Wheeler	15 00

Ten baskets of two quarts each, not less than three varieties:

First, George V. Fletcher	15 00
Second, I. E. Coburn	12 00
Third, George F. Wheeler	10 00

Five baskets, two quarts each, of one variety:

First, Warren Heustis & Son, Marshall	8 00
Second, William Doran & Son, "	6 00
Third, I. E. Coburn, Jessie	5 00
Fourth, George F. Wheeler, Clyde	4 00
Fifth, I. E. Coburn, Clyde	3 00

Two quarts of Belmont:

First, George V. Fletcher	4 00
Second, Warren Heustis & Son	3 00
Third, Mrs. A. W. Blake	2 00

Bubach:

First, Varnum Frost	4 00
Second, Warren Heustis & Son	3 00
Third, George V. Fletcher	2 00

Champion:

First, Barnard Farm	4 00
Second, George F. Wheeler	3 00

Charles Downing:	
First, William Doran & Son	4 00
Second, Miss M. S. Walker	3 00
Third, George F. Wheeler	2 00
Clyde:	
First, Barnard Farm	4 00
Second, George V. Fletcher	3 00
Third, Warren Heustis & Son	2 00
Crescent:	
First, I. E. Coburn	4 00
Second, William C. Winter	3 00
Third, George F. Wheeler	2 00
Cumberland:	
Third, George F. Wheeler	2 00
Haverland:	
First, I. E. Coburn	4 00
Second, Barnard Farm	3 00
Third, Levi Doran & Son	2 00
Hersey:	
First, George F. Wheeler	4 00
Jessie:	
First, I. E. Coburn	4 00
Second, George V. Fletcher	3 00
Third, William Christie	2 00
Leader:	
First, George F. Wheeler	4 00
Marshall:	
First, Varnum Frost	4 00
Second, Warren Heustis & Son	3 00
Third, Estate of Joseph S. Fay	2 00
Miner's Prolific:	
Second, George F. Wheeler	3 00
Third, Charles S. Smith	2 00
Parker Earle:	
First, I. E. Coburn	4 00
Second, George F. Wheeler	3 00
Any other variety:	
First, J. C. Haskell, Seedling	4 00
Second, George F. Wheeler, Enormous	3 00
Third, William C. Winter	2 00
Collection of not less than six varieties, one quart each:	
First, George V. Fletcher	8 00
Second, George F. Wheeler	6 00
One quart of any new variety, not previously exhibited:	
First, Estate of Joseph S. Fay	5 00
Second, Benjamin M. Smith	4 00

CHERRIES. — Two quarts of any variety:

First, O. R. Robbins	4 00
Second, Joshua C. Stone	3 00
Third, George V. Fletcher	2 00

FOREIGN GRAPES.— Two bunches of any variety:

First, E. S. Converse, Black Hamburg	6 00
Second, William C. Winter	4 00

FORCED PEACHES. — Six specimens of any variety:

First, William C. Winter, Waterloo	3 00
Second, William C. Winter, Hale's Early	2 00

JULY 2.

STRAWBERRIES. — Two quarts of any variety:

First, Warren Heustis & Son, Marshall	4 00
Second, Warren Heustis & Son, Belmont	3 00
Third, Benjamin M. Smith, Salem	2 00

CHERRIES. — Two quarts of Black Eagle:

First, E. S. Converse	3 00
Second, F. W. Damon	2 00
Third, Mrs. A. W. Blake	1 00

Black Tartarian:

First, L. M. Chase	3 00
Second, Edwin Hastings	2 00
Third, George V. Fletcher	1 00

Coe's Transparent:

First, L. M. Chase	3 00
Second, John L. Bird	2 00
Third, Mrs. A. W. Blake	1 00

Downer:

First, M. W. Chadbourne	3 00

Any other variety:

First, George V. Fletcher, Guigne Noir	3 00
Second, M. W. Chadbourne, Governor Wood	2 00
Third, Charles B. Travis, Elton	1 00

JULY 9.

RASPBERRIES. — Two quarts of any variety:

First, Benjamin G. Smith, Franconia	3 00
Second, William Doran & Son, Antwerp	2 00

CURRANTS. — Two quarts of any Red variety:

First, W. N. Craig, Versaillaise	4 00
Second, W. N. Craig, Fay's	3 00
Third, E. A. Weeks, "	2 00
Fourth, Francis Blake, "	1 00

Two quarts of any White variety:

First, W. N. Craig, White Grape	3 00
Second, E. S. Converse, White Grape	2 00

GOOSEBERRIES. — Two quarts of any variety of American origin:

First, W. N. Craig, Columbus	4 00
Second, W. N. Craig, Triumph	3 00
Third, Joseph S. Chase, "	2 00
Fourth, Mrs. A. W. Blake, Triumph	1 00

Gratuities: —

M. W. Chadbourne, Cherries	1 00
John L. Bird, "	1 00
A. T. Brown, "	1 00
Miss Vera Chapell, "	1 00
W. N. Craig, "	1 00
Warren Heustis & Son, Strawberries	1 00
William C. Winter, Peaches and Grapes	2 00

JULY 16.

RASPBERRIES. — Two quarts of any variety:

First, Miss E. J. Cutter	3 00
Second, William Doran & Son	2 00
Third, Benjamin G. Smith	1 00

CURRANTS. — One quart of any Red variety:

First, W. N. Craig, Versaillaise	3 00
Second, W. N. Craig, Fay's	2 00
Third, George V. Fletcher, Versaillaise	1 00

One quart of any White variety:

First, W. N. Craig, White Grape	2 00
Second, Mrs. A. W. Blake, White Grape	1 00

GOOSEBERRIES. — Two quarts of any foreign variety:

First, B. G. Smith, Hero of the Nile	4 00
Second, " " Ashton	3 00
Third, " " Eshender Bey	2 00
Fourth, " " Abbotsford	1 00

Gratuities: —

James L. Duncan, Cherries	1 00
W. N. Craig, "	1 00

JULY 23.

BLACKBERRIES. — Two quarts of any variety:

First, M. W. Chadbourne	3 00

APPLES. — Tetofsky:

First, H. K. W. Hall	3 00
Second, George Nelson	2 00

Yellow Transparent:

First, George Nelson	3 00
Second, William C. Winter	2 00

PEARS. — Summer Doyenne:	
First, E. S. Converse	3 00
Second, L. M. Chase	2 00
Third, Joshua C. Stone	1 00
PEACHES. — Six of any variety:	
First, William C. Winter	3 00
Gratuity: —	
W. N. Craig, Currants	1 00

JULY 30.

APPLES. — Red Astrachan:	
First, F. W. Damon	3 00
Second, J. L. Bird	2 00
Third, George C. Rice	1 00
Sweet Bough:	
First, George V. Fletcher	3 00
Second, Charles B. Travis	2 00
Third, F. J. Kinney	1 00
Any other variety:	
First, William C. Winter, Yellow Transparent	3 00
Second, H. K. W. Hall, Tetofsky	2 00
Third, Joshua C. Stone, Williams	1 00
PEARS. — Giffard:	
First, Mrs. E. Emmons	3 00
Second, A. T. Brown	2 00
Third, Rufus T. Tobey	1 00
Any other variety:	
First, J. L. Bird, Wilder	3 00
Second, Mrs. S. Klaus, Clapp's Favorite	2 00
Third, Joshua C. Stone, " "	1 00
BLACKBERRIES. — Two quarts of any variety:	
First, E. C. Lewis	3 00
Second, M. W. Chadbourne	2 00
Third, H. A. Wheeler	1 00
PEACHES. — Outdoor culture, any variety:	
First, N. D. Harrington	3 00
Second, George H. Sherwin	2 00

AUGUST 6.

APPLES. — Oldenburg:	
First, J. V. Fletcher	3 00
Second, Sumner Coolidge	2 00
Third, Samuel Hartwell	1 00
Any other variety:	
First, F. W. Damon, Red Astrachan	3 00
Second, Charles B. Travis, Sweet Bough	2 00
Third, Joshua C. Stone, Williams	1 00

PEARS. — Clapp's Favorite:

First, Sumner Coolidge	3 00
Second, A. T. Brown	2 00
Third, J. V. Fletcher	1 00

Any other variety:

First, Rufus T. Tobey, Giffard	2 00
Second, A. T. Brown, "	1 00

PEACHES. — Twelve specimens of outdoor culture, any variety:

First, Sumner Coolidge, Hale's Early	3 00
Second, George H. Sherwin, Hale's Early	2 00
Third, Warren D. Hinds, Alexander	1 00

Six specimens, cold house or pot culture:

First, William C. Winter, Crawford's Early	3 00
Second, William C. Winter, Crawford's Late	2 00

PLUMS. — Japanese, any variety:

First, W. D. Hinds, Burbank	3 00
Second, W. D. Hinds, Abundance	2 00
Third, W. D. Hinds, Satsuma	1 00

FOREIGN GRAPES. — Two bunches of any variety:

First, E. S. Converse, Black Hamburg	5 00
Second, William C. Winter, Black Hamburg	4 00

AUGUST 13.

APPLES. — Chenango:

First, Sumner Coolidge	3 00
Third, Samuel Hartwell	1 00

Summer Pippin:

First, Warren Fenno	3 00
Second, S. Hartwell	2 00

Williams:

First, Charles F. Curtis	3 00
Second, Joshua C. Stone	2 00
Third, Sumner Coolidge	1 00

Any other variety:

First, Warren Fenno, Red Astrachan	3 00
Second, F. W. Damon	2 00
Third, George V. Fletcher	1 00

PEARS. — Rostiezer:

First, E. S. Converse	3 00
Second, A. T. Brown	2 00
Third, M. W. Chadbourne	1 00

Tyson:

First, Warren Fenno	3 00
Second, John L. Bird	2 00

Any other variety:

First, Sumner Coolidge, Clapp's Favorite	3 00
Second, George V. Fletcher, " "	2 00
Third, A. T. Brown, " "	1 00

PEACHES. — Any variety:	
First, Sumner Coolidge, Early Rivers	3 00
Second, G. L. Brown, Seedling	2 00
PLUMS, JAPANESE. — Abundance:	
First, E. C. Lewis	3 00
Second, Warren D. Hinds	2 00
Third, Samuel Hartwell	1 00
Burbank:	
First, W. D. Hinds	3 00
Gratuities: —	
E. S. Converse, Apricots	1 00
T. C. Thurlow, Ohmer Blackberries	1 00

AUGUST 20.

APPLES. — Foundling:	
First, C. M. Handley	3 00
Gravenstein:	
First, Samuel Hartwell	3 00
Second, C. M. Handley	2 00
Third, George V. Fletcher	1 00
Maiden's Blush:	
First, H. R. Kinney	3 00
Second, Joshua C. Stone	2 00
Third, E. S. Converse	1 00
Porter:	
First, C. M. Handley	3 00
Second, S. Hartwell	2 00
Third, M. W. Chadbourne	1 00
Any other variety:	
First, Varnum Frost, Williams	3 00
Second, Charles F. Curtis, Williams	2 00
Third, C. M. Handley, Fall Orange	1 00
PEARS. — Andrews:	
First, E. S. Converse	3 00
Second, J. C. Stone	2 00
Bartlett:	
First, Mrs. S. Klaus	3 00
Second, A. T. Brown	2 00
Third, Sumner Coolidge	1 00
Any other variety:	
First, Mrs. S. Klaus, Clapp's Favorite	3 00
Second, Sumner Coolidge, " "	2 00
Third, A. T. Brown	1 00
PEACHES. — Single dish of any variety:	
First, Sumner Coolidge, Early Rivers	3 00
Second, G. L. Brown, Seedling	2 00

PLUMS. — Bradshaw:
First, George V. Fletcher 3 00
Any other variety:
First, W. D. Hinds, Abundance 3 00
Second, E. C. Lewis, " 2 00
NATIVE GRAPES. — Winchell or Green Mountain:
First, H. R. Kinney 3 00
Second, Joseph S. Chase 2 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

AUGUST 31 AND SEPTEMBER 1.

Special Prizes from the Theodore Lyman Fund.

For the heaviest and best ripened bunch of any Foreign Black Grape:
Second, Miss E. J. Clark, Alicante 10 00
For the heaviest and best ripened bunch of any Foreign White Grape, Syrian excluded:
Second, E. S. Converse, Foster's Seedling 10 00

Society's Prizes.

FOREIGN GRAPES. — Two bunches of Black Alicante:
First, Miss E. J. Clark 5 00
Black Hamburg:
First, Miss E. J. Clark 5 00
Second, E. S. Converse 4 00
Third, William C. Winter 3 00
Golden Hamburg:
First, Miss E. J. Clark 5 00
Second, E. S. Converse 4 00
Muscat of Alexandria:
First, William C. Winter 5 00
Second, E. S. Converse 4 00
Any other variety:
First, E. S. Converse, Foster's Seedling 5 00
Second, E. S. Converse, Blue Chasselas 4 00

Gratuity: —
William C. Winter, Peaches 2 00

SEPTEMBER 10.

APPLES. — Garden Royal:
First, C. M. Handley 3 00
Gravenstein:
First, Samuel Hartwell 3 00
Second, George V. Fletcher 2 00
Third, E. M. Bruce 1 00

Maiden's Blush:	
First, H. R. Kinney	3 00
Second, Warren Fenno	2 00
Third, Dr. W. G. Kendall	1 00
Porter:	
First, George W. Stevens	3 00
Second, C. M. Handley	2 00
Third, Charles S. Smith	1 00
Pumpkin Sweet:	
First, Samuel Hartwell	3 00
Second, G. W. Stevens	2 00
Third, John Parker	1 00
Washington Strawberry:	
First, Sumner Coolidge	3 00
Second, Joshua C. Stone	2 00
Third, C. T. Foster	1 00
Any other variety:	
First, W. D. Hinds, Wealthy	3 00
Second, Samuel Hartwell, Stump	2 00
Third, Samuel Hartwell, Somerset	1 00
CRAB APPLES. — Twenty-four specimens of Transcendent:	
First, L. J. Fosdick	2 00
Any other variety:	
First, C. L. Hartshorn, Hyslop	2 00
Second, Mrs. A. E. Mayell, Siberian	1 00
PEARS. — Bartlett:	
First, Sumner Coolidge	3 00
Second, A. T. Brown	2 00
Third, Charles F. Curtis	1 00
Belle Lucrative:	
First, C. E. Richardson	3 00
Second, Clifford R. Weld	2 00
Third, A. T. Brown	1 00
Boussock:	
First, Sumner Coolidge	3 00
Second, Charles E. Swain	2 00
Third, A. M. Leavitt	1 00
Hardy:	
First, Rufus T. Tobey	3 00
Second, William Milman	2 00
Third, Charles F. Curtis	1 00
Paradise of Autumn:	
First, William Milman	3 00
Second, Warren Fenno	2 00
Third, Rufus T. Tobey	1 00
Souvenir du Congrès:	
First, A. T. Brown	3 00

Second, William Christie	2 00
Third, Warren Fenno	1 00
Any other variety:	
First, A. T. Brown, Flemish Beauty	3 00
Second, A. T. Brown, De Tongres	2 00
Third, Charles E. Swain, Seckel	1 00
PEACHES. — Coolidge's Favorite:	
First, Joseph L. Duncan	3 00
Second, Warren D. Hinds	2 00
Third, Sumner Coolidge	1 00
Crawford's Early:	
First, W. D. Hinds	3 00
Second, E. M. Bruce	2 00
Third, Sumner Coolidge	1 00
Crosby:	
First, T. A. Greenleaf	3 00
Second, W. D. Hinds	2 00
Foster:	
First, Charles F. Curtis	3 00
Second, C. R. Safford	2 00
Third, Sumner Coolidge	1 00
Oldmixon Freestone:	
First, W. D. Hinds	3 00
Second, Sumner Coolidge	2 00
Third, Miss E. J. Cutter	1 00
Stump the World:	
First, G. L. Brown	3 00
Any other variety:	
First, W. D. Hinds, Elberta	3 00
Second, T. A. Greenleaf, Mountain Rose	2 00
Third, W. D. Hinds, " "	1 00
NECTARINES, OUTDOOR CULTURE. — Any variety:	
First, C. C. Donnell	4 00
Second, Warren Fenno	3 00
PLUMS. — Imperial Gage:	
First, Sumner Coolidge	3 00
Second, John Parker	2 00
Third, George V. Fletcher	1 00
Jefferson:	
First, Charles F. Curtis	3 00
Lombard:	
First, J. L. Bird	3 00
Second, L. M. Chase	2 00
Third, Joshua C. Stone	1 00
Any other variety:	
First, F. J. Kinney, Bradshaw	3 00
Second, Miss E. J. Cutter, Bradshaw	2 00
Third, George V. Fletcher, "	1 00

Japanese Plums, any variety:	
First, Sumner Coolidge, Burbank	3 00
Second, W. D. Hinds, Satsuma	2 00
Third, T. A. Greenleaf	1 00
NATIVE GRAPES. — Moore's Early:	
First, F. W. Damon	3 00
Second, H. R. Kinney	2 00
Third, Samuel Hartwell	1 00
Any other variety:	
First, E. C. Lewis, Lady Washington	3 00
Second, F. J. Kinney, Niagara	2 00
Any variety from girdled vines:	
First, F. J. Kinney, Worden	3 00
Second, H. R. Kinney, Delaware	2 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

SEPTEMBER 29 AND 30.

Special Prizes from the Samuel Appleton Fund.

APPLES. — Baldwin, Sumner Coolidge	5 00
Hubbardston, E. M. Bruce	5 00
PEARS. — Bosc, Sumner Coolidge	5 00
Sheldon, A. T. Brown	5 00

Benjamin V. French Fund.

APPLES. — Gravenstein, Samuel Hartwell	5 00
Rhode Island Greening, C. L. Hartshorn	5 00

Marshall P. Wilder Fund.

PEARS. — Anjou:	
First, George V. Fletcher	4 00
Second, William Milman	3 00
Third, A. T. Brown	2 00
Fourth, F. W. Damon	1 00
Bartlett:	
First, Varnum Frost	4 00
Second, Charles F. Curtis	3 00
Third, George V. Fletcher	2 00
Fourth, Sumner Coolidge	1 00
NATIVE GRAPES. — Twelve bunches of Concord:	
First, H. R. Kinney	4 00
Second, William Doran & Son	3 00
Third, F. J. Kinney	2 00
Twelve bunches of Worden:	
First, F. J. Kinney	4 00
Second, H. R. Kinney	3 00

Theodore Lyman Fund.

APPLES. — Baldwin:	
First, C. L. Hartshorn	4 00
Second, John W. Clark	3 00
Third, Sumner Coolidge	2 00
Dutch Codlin:	
First, Warren Fenno	3 00
Second, Sumner Coolidge	2 00
Third, Joshua C. Stone	1 00
Fall Orange or Holden:	
First, Charles S. Smith	3 00
Second, H. R. Kinney	2 00
Third, C. M. Handley	1 00
Fameuse:	
First, Sumner Coolidge	3 00
Second, George V. Fletcher	2 00
Third, M. W. Chadbourne	1 00
Fletcher Russet:	
First, George V. Fletcher	3 00
Second, John Fletcher	2 00
Third, C. F. Curtis	1 00
Gloria Mundi:	
First, Samuel Hartwell	3 00
Second, E. M. Bruce	2 00
Golden Russet:	
First, George V. Fletcher	2 00
Second, H. R. Kinney	1 00
Gravenstein:	
First, Samuel Hartwell	4 00
Second, E. M. Bruce	3 00
Third, George Nelson	2 00
Hubbardston:	
First, C. L. Hartshorn	4 00
Second, John W. Clark	3 00
Third, E. M. Bruce	2 00
Hunt Russet:	
First, W. H. Hunt	3 00
Second, E. M. Bruce	2 00
Third, Samuel Hartwell	1 00
Jacobs Sweet:	
First, Charles F. Curtis	3 00
Second, M. Martin	2 00
Lady's Sweet:	
First, C. C. Shaw	2 00
Second, David L. Fiske	1 00
Mackintosh:	
First, F. J. Kinney	4 00

Second, Samuel Hartwell	3 00
Third, C. C. Shaw	2 00
Maiden's Blush:	
First, Warren Fenno	2 00
Second, H. R. Kinney	1 00
Mother:	
First, Warren Fenno	3 00
Second, H. R. Kinney	2 00
Third, George C. Rice	1 00
Northern Spy:	
First, C. L. Hartshorn	3 00
Second, George V. Fletcher	2 00
Third, Warren Fenno	1 00
Porter:	
First, Charles S. Smith	3 00
Second, Sumner Coolidge	2 00
Third, George V. Fletcher	1 00
Pound Sweet:	
First, George V. Fletcher	3 00
Second, George C. Rice	2 00
Third, Samuel Hartwell	1 00
Rhode Island Greening:	
First, C. C. Shaw	4 00
Second, Joshua C. Stone	3 00
Third, George V. Fletcher	2 00
Roxbury Russet:	
First, Mrs. E. J. Cutter	4 00
Second, Sumner Coolidge	3 00
Third, Jacob A. Leonard	2 00
Sutton:	
First, C. L. Hartshorn	3 00
Second, E. M. Bruce	2 00
Third, George C. Rice	1 00
Tolman's Sweet:	
First, W. P. Plimpton	3 00
Second, Jacob A. Leonard	2 00
Third, George Nelson	1 00
Tompkins King:	
First, George C. Rice	3 00
Second, J. A. King	2 00
Third, Samuel Hartwell	1 00
Washington Royal or Palmer:	
First, E. M. Bruce	3 00
Second, George C. Rice	2 00
Third, O. B. Hadwen	1 00
Wealthy:	
First, W. D. Hinds	3 00

Second, C. M. Handley	2 00
Third, George C. Rice	1 00
Any other variety:	
First, George C. Rice, Fallawater	3 00
Second, William Doran & Son, Bellflower	2 00
Third, Mrs. Mary T. Goddard, "	1 00
CRAB APPLES. — Hyslop, twenty-four specimens:	
First, W. D. Hinds	2 00
Second, M. W. Chadbourne	1 00
Any other variety, twenty-four specimens:	
First, F. J. Kinney	2 00

Special Prizes offered by the Society.

PEARS. — Anjou, Ellwanger & Barry	5 00
Seckel, A. T. Brown	5 00
PEACHES. — Any variety, Sumner Coolidge	5 00
NATIVE GRAPES. — Any variety, E. A. Adams	5 00

Society's Regular Prizes.

PEARS. — Angouleme:	
First, W. S. Janvrin	4 00
Second, A. T. Brown	3 00
Third, Mrs. E. Emmons	2 00
Fourth, F. W. Damon	1 00
Bosc:	
First, Charles E. Swain	4 00
Second, A. T. Brown	3 00
Third, Charles F. Curtis	2 00
Fourth, John C. Davenport	1 00
Clairgeau:	
First, Charles F. Curtis	3 00
Second, W. S. Janvrin	2 00
Third, Sumner Coolidge	1 00
Comice:	
First, A. T. Brown	3 00
Second, Mrs. E. Emmons	2 00
Third, Warren Fenno	1 00
Dana's Hovey:	
First, A. T. Brown	4 00
Second, Charles E. Swain	3 00
Third, George V. Fletcher	2 00
Fourth, A. C. Osborn	1 00
Diel:	
First, Charles E. Swain	3 00
Second, Mrs. E. Emmons	2 00
Third, A. T. Brown	1 00

Fulton:	
First, E. S. Converse	3 00
Second, S. F. & F. L. Weston	2 00
Hardy:	
First, Samuel Hartwell	3 00
Second, Rufus T. Tobey	2 00
Third, William Milman	1 00
Howell:	
First, Abram K. Gould	3 00
Second, Warren Fenno	2 00
Third, J. E. Fuller	1 00
Josephine of Malines:	
First, Warren Fenno	3 00
Second, David L. Fiske	2 00
Lawrence:	
First, Mrs. E. Emmons	3 00
Second, A. T. Brown	2 00
Third, L. M. Chase	1 00
Louise Bonne of Jersey:	
First, C. E. Richardson	3 00
Second, Mrs. James McCormick	2 00
Third, A. T. Brown	1 00
Marie Louise:	
First, Charles E. Swain	3 00
Second, Elbridge Torrey	2 00
Third, Warren Fenno	1 00
Merriam:	
First, Charles F. Curtis	3 00
Second, Sumner Coolidge	2 00
Third, F. W. Damon	1 00
Onondaga:	
First, Sumner Coolidge	3 00
Second, Charles B. Travis	2 00
Seckel:	
First, Charles E. Swain	4 00
Second, A. T. Brown	3 00
Third, Mrs. S. Klaus	2 00
Fourth, William Milman	1 00
Sheldon:	
First, A. T. Brown	4 00
Second, Elbridge Torrey	3 00
Third, Charles E. Swain	2 00
Fourth, Clifford R. Weld	1 00
St. Michael Archangel:	
First, Warren Heustis & Son	3 00
Second, Warren Fenno	2 00
Third, Benjamin G. Smith	1 00

Superfin:	
First, Mr. Ward	3 00
Second, Warren Fenno	2 00
Third, Sumner Coolidge	1 00
Urbaniste:	
First, Mrs. E. Emmons	3 00
Second, E. S. Converse	2 00
Third, A. T. Brown	1 00
Vicar:	
First, Mrs. Jones	3 00
Second, E. S. Converse	2 00
Third, A. T. Brown	1 00
Winter Nelis:	
First, A. T. Brown	3 00
Second, Clifford R. Weld	2 00
Third, Mrs. E. Emmons	1 00
Any other variety:	
First, Mrs. E. Emmons, Mount Vernon	3 00
Second, A. T. Brown, Souvenir du Congrès	2 00
Third, A. T. Brown, Flemish Beauty	1 00
QUINCES. — Champion:	
First, George V. Fletcher	3 00
Second, Charles B. Travis	2 00
Orange:	
First, Arthur F. Coolidge	3 00
Second, George V. Fletcher	2 00
Third, Joshua C. Stone	1 00
Pear:	
First, G. L. Brown	3 00
Second, Benjamin G. Smith	2 00
Third, George V. Fletcher	1 00
Rea:	
First, Mrs. Mary T. Goddard	3 00
Second, Warren Fenno	2 00
PEACHES. — Crawford's Late:	
First, Mrs. Mary T. Goddard	3 00
Second, N. D. Harrington	2 00
Third, E. M. Bruce	1 00
Any other variety:	
First, E. M. Bruce	3 00
Second, Sumner Coolidge	2 00
Third, T. A. Greenleaf	1 00
PLUMS. — Coe's Golden Drop:	
First, Abram K. Gould	2 00
Yellow Egg:	
First, George V. Fletcher	2 00

Any other variety:	
First, W. D. Hinds	2 00
Second, T. A. Greenleaf	1 00
NATIVE GRAPES. — Six bunches of Brighton:	
First, E. A. Adams	3 00
Second, Joseph S. Chase	2 00
Third, E. M. Bruce	1 00
Delaware:	
First, H. R. Kinney	4 00
Second, F. W. Damon	3 00
Third, J. S. Chase	2 00
Herbert:	
First, E. A. Adams	3 00
Second, J. S. Chase	2 00
Third, E. C. Lewis	1 00
Iona:	
First, F. W. Damon	3 00
Second, J. S. Chase	2 00
Lindley:	
First, Benjamin G. Smith	3 00
Niagara:	
First, George A. Wills	3 00
Second, Frank G. Wellington	2 00
Third, J. S. Chase	1 00
Pocklington:	
First, T. H. Jackman	4 00
Second, J. S. Chase	3 00
Third, Sumner Coolidge	2 00
Prentiss:	
First, J. S. Chase	3 00
Second, Benjamin G. Smith	2 00
Wilder:	
First, E. A. Adams	3 00
Second, Benjamin G. Smith	2 00
Third, E. C. Lewis	1 00
Any other variety:	
First, John Parker	3 00
Second, H. R. Kinney	2 00
Third, J. S. Chase	1 00
Any variety from girdled vines:	
First, H. R. Kinney	3 00
Second, F. J. Kinney	2 00
FOREIGN GRAPES. — Two bunches of any variety, cold-house culture:	
First, Benjamin G. Smith	5 00
Second, E. S. Converse	4 00
CRANBERRIES. — Half-peck:	
First, L. J. Fosdick	3 00

Gratuities : —

Samuel Hartwell, Gravenstein Apples	3 00
H. A. Wheeler, Collection of Apples	1 00
Warren D. Hinds, Edible Nuts	1 00
Warren Fenno, Collection	3 00
James Comley, "	2 00
M. W. Chadbourne, "	1 00

EXHIBITION OF WINTER FRUITS AND VEGETABLES.

NOVEMBER 5.

Benjamin V. French Fund.

APPLES. — Baldwin, C. F. Boyden	5 00
Rhode Island Greening, C. L. Hartshorn	5 00

Society's Prizes.

APPLES. — Baldwin:	
First, E. M. Bruce	3 00
Second, William C. Clapp	2 00
Third, C. L. Hartshorn	1 00
Danvers Sweet:	
First, Warren Fenno	3 00
Third, C. M. Handley	1 00
Fletcher Russet:	
First, George V. Fletcher	3 00
Second, Charles F. Curtis	2 00
Hubbardston:	
First, Amos T. Leavitt	3 00
Second, C. L. Hartshorn	2 00
Third, Samuel Hartwell	1 00
Hunt Russet:	
First, E. M. Bruce	3 00
Second, S. Hartwell	2 00
Third, Rev. C. Terry	1 00
Lady's Sweet:	
First, C. C. Shaw	3 00
Northern Spy:	
First, C. L. Hartshorn	3 00
Second, George V. Fletcher	2 00
Third, John L. Bird	1 00
Rhode Island Greening:	
First, Mrs. E. Emmons	3 00
Second, Warren Fenno	2 00
Third, William C. Clapp	1 00
Roxbury Russet:	
First, H. R. Kinney	3 00
Second, Mrs. E. J. Cutter	2 00
Third, Mrs. Mary T. Goddard	1 00

Tolman's Sweet:	
First, Mrs. A. E. Underwood	3 00
Second, W. P. Plimpton	2 00
Third, C. C. Shaw	1 00
Tompkins King:	
First, George C. Rice	3 00
Second, Samuel Hartwell	2 00
Third, C. L. Hartshorn	1 00
Any other variety:	
First, C. C. Shaw, Bellflower	3 00
Second, F. J. Kinney, Mackintosh	2 00
Third, George V. Fletcher, Pound Sweet	1 00
PEARS. — Angouleme:	
First, F. W. Damon	4 00
Second, A. T. Brown	3 00
Third, Mrs. E. Emmons	2 00
Fourth, F. J. Ward	1 00
Anjou:	
First, Mrs. S. Klaus	4 00
Second, A. T. Brown	3 00
Third, William Milman	2 00
Fourth, Clifford R. Weld	1 00
Clairgeau:	
First, Charles F. Curtis	3 00
Second, Warren Fenno	2 00
Third, F. W. Damon	1 00
Comice:	
First, A. T. Brown	4 00
Second, Mrs. E. Emmons	3 00
Third, Warren Fenno	2 00
Fourth, John L. Bird	1 00
Dana's Hovey:	
First, A. T. Brown	4 00
Second, Charles E. Swain	3 00
Third, J. L. Bird	2 00
Fourth, F. W. Damon	1 00
Diel:	
First, Charles E. Swain	3 00
Second, Mrs. E. Emmons	2 00
Third, A. T. Brown	1 00
Glout Morceau:	
First, Clifford R. Weld	3 00
Josephine of Malines:	
First, Warren Fenno	3 00
Second, J. L. Bird	2 00
Third, Francis Blake	1 00

Langelier:	
First, Clifford R. Weld	3 00
Second, Mrs. S. Klaus	2 00
Third, A. T. Brown	1 00
Lawrence:	
First, L. M. Chase	3 00
Second, W. S. Janvrin	2 00
Third, Mrs. E. Emmons	1 00
Vicar:	
First, Mrs. Jones	3 00
Second, E. S. Converse	2 00
Winter Nelis:	
First, A. T. Brown	3 00
Second, Clifford R. Weld	2 00
Third, Mrs. E. Emmons	1 00
Any other variety:	
First, William Milman, Mount Vernon	3 00
Second, A. T. Brown, Sheldon	2 00
Third, Charles E. Swain, Bosc	1 00
FOREIGN GRAPES. — Two bunches of any variety:	
First, William C. Winter, Gros Colman	5 00
Second, Benjamin G. Smith, Muscat of Alexandria	4 00
Third, E. S. Converse, Alicante	3 00

Gratuities: —

Willard Howard, Cranberries	3 00
L. J. Fosdick, "	2 00
Rev. C. Terry, "	1 00
James L. Duncan, Quinces	1 00

E. W. WOOD,
CHARLES F. CURTIS,
O. B. HADWEN,
WARREN FENNO,
SAMUEL HARTWELL,
J. WILLARD HILL,
SUMNER COOLIDGE,
Committee on Fruits.

REPORT

OF THE

COMMITTEE ON VEGETABLES,

FOR THE YEAR 1898.

By CHARLES N. BRACKETT, CHAIRMAN.

Unusual weather conditions prevailed the past season, which was remarkable for its extremes of both heat and moisture. These conditions, while favorable to some classes of vegetables, in others, such as the squash and tomato, for instance, caused a rank and over-luxuriant growth of vines at the expense of the crop. On the whole, however, the exhibits throughout the year have been exceedingly satisfactory, and the number of contributors has increased. Prize exhibitions in this department commenced January 9, at which time there was a very fine show of forced vegetables in great variety, and again, on February 5, was an equally good exhibition with close competition for the prizes on both occasions.

At each Saturday following, up to the Spring Exhibition, liberal displays were made, the principal exhibitors being George D. Moore, Warren Heustis & Son, Arthur F. Coolidge, and James Comley.

The Spring Show, March 22 to 25, was excellent, and the same remark applies to the Rhododendron Show, June 7 and 8. At both of these exhibitions interesting displays of seasonable, well-grown vegetables were made, which were very creditable to the exhibitors. At the Spring Exhibition some excellent specimens of Mushrooms were shown by H. R. Kinney, A. W. Crockford, and I. E. Coburn, which were worthy of special mention; also Tomatoes, by W. C. Winter and Francis Blake.

The prizes for vegetables at the Rose and Strawberry Show, June 23 and 24, called forth a sharp competition from a large number of cultivators. George D. Moore was the largest contributor at this show and carried off a majority of first prizes. The quality and variety of his exhibits furnished ample evidence of his skill as a grower of fine vegetables. All the prizes scheduled were competed for and taken, and altogether this exhibition proved very satisfactory.

As the season advanced there was a corresponding improvement in quantity, quality, and variety of the objects offered in competition. Asparagus was late in making its appearance, and was not shown in the usual quantity. The first exhibit was made May 21, by William H. Hunt. The first Peas of the season were shown June 18, by Norris J. Comley. Tomatoes of open culture made their appearance for the first time July 9, C. L. Hartshorn and W. N. Craig being the exhibitors. The first prize award for Potatoes was made July 16, C. L. Hartshorn receiving the first prize. Sweet Corn was also shown for the first time at this exhibition, by Joshua C. Stone and Sumner Coolidge.

One of the largest and best shows of the season previous to the Annual was made at the closing of the weekly exhibitions, September 10. All the scheduled prizes were competed for and awarded. This show is always looked forward to as one of the most interesting of the season, and the present one fully sustained that reputation. The largest contributors were C. L. Hartshorn, H. R. Kinney, E. C. Lewis, and Warren Heustis & Son.

There has been no lack of enthusiasm manifested the past year by the exhibitors of Native Mushrooms during their season, and their exhibits have attracted crowds of interested visitors on each and every occasion.

After all that has been said about the large quantity of valuable food that is going to waste in the shape of edible Mushrooms, recent investigations made by Prof. L. B. Mendel, of Yale University, show that the nutritive value of the Mushroom is not so very high. "Science" describes Professor Mendel's experiment as follows: "Chemical analyses were combined with experiments in artificial digestion, and special attention was given to the amount of available (digestible) proteid present. The latter was found to be

not over two or three per cent in Mushrooms, which shows that the prevailing idea of the great nutritive value of Mushrooms is not yet justified. They may be valuable as dietetic accessories, but they do not deserve the term 'vegetable beefsteak.' Their nitrogen is largely in the form of non-proteid bodies. The amount of fat, cholesterin, soluble carbo-hydrates, crude fibre, and inorganic substances contained in them corresponds in general with that found in other vegetable foods, such as corn, peas, and potatoes."

The Annual Exhibition, all things considered, was undoubtedly one of the best we have ever made. The tables in the lower hall were fairly well filled. The show of Potatoes was not quite up in quantity to that of some former occasions, but the quality was excellent. F. J. Kinney took the first prize for the best four varieties. His specimens indicated careful culture on the part of the exhibitor, and attracted the attention of the visiting public by their uniformity and smoothness of growth.

The Schedule of Prizes for 1899 remains practically the same as that of the present year, very few changes having been made.

The amount appropriated for the year 1898 was . .	$1,200
Awards of prizes and gratuities have been made to the amount of	1,148
Leaving an unexpended balance of	$52

All of which is respectfully submitted.

For the Committee,

C. N. Brackett,

Chairman.

PRIZES AND GRATUITIES AWARDED FOR VEGETABLES.

1898.

JANUARY 8.

RADISHES. — Four bunches of any variety:	
First, Arthur F. Coolidge	$3 00
CELERY. — Four roots:	
First, Warren Heustis & Son, Boston Market	3 00
Second, Warren Heustis & Son, Pascal	2 00
Third, H. R. Kinney	1 00
LETTUCE. — Four heads of Tennisball:	
First, George D. Moore	3 00
Second, George D. Moore, Rawson's Curly	2 00
Third, H. R.Kinney	1 00
PARSLEY. — Two quarts:	
First, W. N. Craig	2 00
Second, H. R. Kinney	1 00
MUSHROOMS. — Twenty-four specimens:	
First, H. R. Kinney	3 00
Second, E. S. Converse	2 00
TOMATOES. — Twelve specimens:	
First, William C. Winter, Chemin	3 00
Second, William C. Winter, May's Favorite	2 00
Third, William C. Winter, Stone	1 00
Gratuities: —	
Mrs. A. W. Blake, Collection	2 00
Warren Heustis & Son, "	1 00

JANUARY 30.

Gratuities: —	
Norris J. Comley, Radishes	1 00
Charles H. Hovey, South Pasadena, Cal., Tomatoes	1 00
Arthur F. Coolidge, Collection	2 00

FEBRUARY 5.

RADISHES. — Four bunches of any variety:	
First, Joshua C. Stone	2 00
Second, Arthur F. Coolidge	1 00
SALSIFY. — Twelve specimens:	
First, H. R. Kinney	3 00
Second, Warren Heustis & Son	2 00
Third, Mrs. A. W. Blake	1 00
CUCUMBERS. — Pair of any variety:	
First, E. M. Bruce	3 00
Second, Francis Blake	2 00

CELERY. — Four roots:	
First, E. M. Bruce, Boston Market	3 00
Second, Warren Heustis & Son	2 00
Third, E. M. Bruce, New Queen	1 00
LETTUCE. — Four heads of Tennisball:	
First, Joshua C. Stone	3 00
Second, H. R. Kinney	2 00
Third, George D. Moore	1 00
MUSHROOMS. — Twenty-four specimens:	
First, H. R. Kinney	3 00
Second, Francis Blake	2 00
RHUBARB. — Twelve stalks:	
First, George D. Moore	3 00
Second, Charles F. Smith	2 00
Third, Mrs. A. W. Blake	1 00
TOMATOES. — Twelve specimens:	
First, William C. Winter, Stone	3 00
Second, William C. Winter, May's Favorite	2 00
Third, William C. Winter, Chemin	1 00
Gratuities: —	
Mrs. A. W. Blake, Collection	1 00
Warren Heustis & Son, "	1 00

FEBRUARY 12.

Gratuities: —	
George D. Moore, Lettuce	1 00
Warren Heustis & Son, Celery	1 00

FEBRUARY 19.

Gratuities: —	
Warren Heustis & Son, Celery	1 00
James Comley, Rhubarb	1 00

FEBRUARY 26.

Gratuities: —	
Warren Heustis & Son, Celery	1 00
Arthur F. Coolidge, Collection	1 00
George D. Moore, "	1 00

MARCH 12.

Gratuities: —	
George D. Moore, Lettuce	1 00
Arthur F. Coolidge, Collection	2 00

MARCH 19.

Gratuity: —	
Arthur F. Coolidge, Collection	2 00

SPRING EXHIBITION.

MARCH 22, 23, 24, AND 25.

William J. Walker Fund.

RADISHES. — Turnip Rooted, four bunches:

First, Arthur F. Coolidge	2 00
Second, H. R. Kinney	1 00
Long Scarlet:	
First, H. R. Kinney	2 00
Second, Arthur F. Coolidge	1 00
CUCUMBERS. — White Spine, pair:	
First, E. B. Smith	3 00
Second, E. M. Bruce	2 00
SPINACH. — Half-peck:	
First, Warren Heustis & Son	2 00
Second, Hon. Aaron Low	1 00
DANDELIONS. — Peck:	
First, Arthur F. Coolidge	3 00
Second, Joshua C. Stone	2 00
Third, C. L. Hartshorn	1 00
LETTUCE. — Tennisball, four heads:	
First, C. L. Hartshorn	3 00
Second, George D. Moore	2 00
Third, Arthur F. Coolidge	1 00
WATER CRESS. — Two quarts:	
First, Arthur F. Coolidge	2 00
PARSLEY. — Two quarts:	
First, C. L. Hartshorn	2 00
Second, H. R. Kinney	1 00
MUSHROOMS. — Twenty-four specimens:	
First, H. R. Kinney	3 00
Second, A. W. Crockford	2 00
Third, I. E. Coburn	1 00
RHUBARB. — Twelve stalks:	
First, George D. Moore	3 00
TOMATOES. — Twelve specimens.	
First, Francis Blake	3 00
Second, William C. Winter, Stone	2 00
Third, William C. Winter, Chemin	1 00

Gratuities: —

Hon. Aaron Low, Potatoes	3 00
A. W. Crockford, String Beans	1 00
Benjamin P. Ware, Brussels Sprouts	1 00
M. W. Chadbourne, Artichokes	1 00
Warren Heustis & Son, Collection	2 00

APRIL 2.

PARSNIPS. — Twelve specimens:	
First, Warren Heustis & Son	3 00
CUCUMBERS. — White Spine, pair:	
First, E. B. Smith	3 00
Second, E. M. Bruce	2 00
Gratuities: —	
E. M. Bruce, Celery, Queen	1 00
Rev. Calvin Terry, Squashes	1 00
Arthur F. Coolidge, Collection	2 00
Mrs. A. W. Blake, "	1 00
Hon. Aaron Low, "	1 00

APRIL 9.

Gratuity: —	
James Comley, Mushrooms	1 00

APRIL 16.

Gratuities: —	
George D. Moore, Lettuce	1 00
Warren Heustis & Son, Dandelions	1 00

APRIL 23.

Gratuity: —	
Warren Heustis & Son, Lettuce	1 00

APRIL 30.

Gratuities: —	
Mrs. E. M. Gill, Tomatoes	1 00
Warren Heustis & Son, Dandelions	1 00
Arthur F. Coolidge, Collection	1 00
George D. Moore, "	1 00

MAY EXHIBITION.

MAY 7.

William J. Walker Fund.

CUCUMBERS. — White Spine, pair:	
First, Francis Blake	3 00
Second, Arthur F. Coolidge	2 00
Third, George D. Moore	1 00
SPINACH. — Peck:	
First, Hon. Aaron Low	3 00
DANDELIONS. — Peck:	
First, Warren Heustis & Son	2 00
Second, Arthur F. Coolidge	1 00

LETTUCE. — Four heads:

First, W. N. Craig	3 00
Second, C. L. Hartshorn	2 00
Third, Warren Heustis & Son	1 00

RHUBARB. — Twelve stalks:

First, Warren Heustis & Son	2 00
Second, Hon. Aaron Low	1 00

TOMATOES. — Twelve specimens:

First, Francis Blake, Best of All	3 00
Second, William Nicholson, Frogmore	2 00
Third, Francis Blake, Eclipse	1 00

Gratuities: —

Francis Blake, Tomatoes	1 00
Mrs. E. M. Gill, "	1 00
William Nicholson, Tomatoes	1 00
Arthur F. Coolidge, Beets and Cucumbers	1 00
W. N. Craig, Collection	3 00
Warren Heustis & Son, Collection	1 00

MAY 14.

Gratuity: —

Warren Heustis & Son, Collection	1 00

MAY 21.

Gratuities: —

W. H. Hunt, Asparagus	1 00
Norris F. Comley, Cucumbers	1 00
Warren Heustis & Son, Lettuce	1 00
Mrs. E. M. Gill, Tomatoes	1 00
William Christie, Cauliflowers	1 00

MAY 28.

Gratuities: —

Warren Heustis & Son, Collection	1 00
George D. Moore, "	1 00

JUNE 4.

Gratuities: —

George D. Moore, Collection	2 00
Warren Heustis & Son, "	1 00

RHODODENDRON EXHIBITION.

JUNE 7 AND 8 (POSTPONED FROM JUNE 2 AND 3).

Theodore Lyman Fund.

BEETS. — Twelve specimens, any variety:

First, C. L. Hartshorn	3 00
Second, Warren Heustis & Son	2 00

CARROTS. — Short Scarlet, twelve:	
First, W. N. Craig, Sutton's Early	3 00
Second, W. N. Craig, Early Horn	2 00
RADISHES. — Turnip Rooted, four bunches:	
First, Warren Heustis & Son	2 00
Second, George D. Moore	1 00
Long Scarlet:	
First, George D. Moore	2 00
ASPARAGUS. — Four bunches, twelve stalks each:	
First, W. H. Hunt	3 00
Second, C. L. Hartshorn	2 00
CUCUMBERS. — Pair:	
First, George D. Moore, White Spine	3 00
Second, C. L. Hartshorn	2 00
Third, George D. Moore, Eureka	1 00
LETTUCE. — Four heads:	
First, George D. Moore	3 00
Second, C. L. Hartshorn	2 00
RHUBARB. — Twelve stalks:	
First, Warren Heustis & Son	3 00
Second, George D. Moore	2 00
Third, Hon. Aaron Low	1 00
Gratuities: —	
William C. Winter, Tomatoes	1 00
Mrs. A. W. Blake, Rhubarb	1 00
James Comley, "	1 00
Warren Heustis & Son, Collection	2 00
George D. Moore, "	2 00
W. N. Craig, "	2 00

JUNE 11.

Gratuities: —	
W. H. Hunt, Asparagus	1 00
Miss H. M. Noyes, Mushrooms	1 00

JUNE 18.

Gratuities: —	
Estate of Joseph S. Fay, Lettuce	2 00
Warren Heustis & Son, "	1 00
W. H. Hunt, Asparagus	1 00
Norris F. Comley, Peas	1 00
Mrs. E. M. Gill, Tomatoes	1 00
William Doran & Son, Collection	2 00
W. N. Craig, "	1 00
George D. Moore, "	1 00

ROSE AND STRAWBERRY EXHIBITION.

June 23 and 24.

Beets. — Summer Turnip Rooted, twelve:	
First, C. L. Hartshorn	3 00
Second, Warren Heustis & Son	2 00
Third, Joshua C. Stone	1 00
Onions. — Twelve specimens:	
First, George D. Moore	3 00
Second, C. L. Hartshorn	2 00
Third, Warren Heustis & Son	1 00
Cucumbers. — White Spine, pair:	
First, George D. Moore	3 00
Second, Arthur F. Coolidge	2 00
Third, Joshua C. Stone	1 00
Any other variety:	
First, W. N. Craig	3 00
Second, George D. Moore	2 00
Cabbages. — Three of any variety, trimmed:	
First, George D. Moore	3 00
Third, C. L. Hartshorn	1 00
Lettuce.— Tennisball, four heads:	
First, George D. Moore	3 00
Second, Warren Heustis & Son	2 00
Third, Joseph Thorp	1 00
Any other variety:	
First, Warren Heustis & Son	2 00
Second, George D. Moore	1 00
Peas. —Half-peck of any variety:	
First, George D. Moore, Prosperity	3 00
Second, C. L. Hartshorn "	2 00
Third, Arthur Warburton "	1 00
Gratuities: —	
William Christie, Carrots	1 00
George D. Moore, Collection	3 00
W. N. Craig, "	2 00
Norris F. Comley, "	1 00
Warren Heustis & Son, "	1 00

July 2.

Onions. — Twelve specimens:	
First, George D. Moore	2 00
Second, C. L. Hartshorn	1 00
Squashes. — Long Warted, four:	
First, C. L. Hartshorn	2 00
Second, Joshua C. Stone	1 00

Scalloped:

First, Joshua C. Stone	2 00

CABBAGES. — Three of any variety, trimmed:

First, George D. Moore, Early Spring	3 00
Second, George D. Moore, All Head	2 00
Third, C. L. Hartshorn	1 00

PEAS. — American Wonder, half-peck:

First, E. C. Lewis	3 00
Second, C. L. Hartshorn	2 00

Advancer:

First, C. L. Hartshorn	3 00

Any other variety:

First, George D. Moore, Prosperity	3 00
Second, C. L. Hartshorn, "	2 00
Third, E. C. Lewis, Nott's Excelsior	1 00

Gratuities: —

Mrs. E. M. Gill, Tomatoes	1 00
George D. Moore, Collection	2 00
E. C. Lewis, "	1 00
Warren Heustis & Son, "	1 00

JULY 9.

Levi Whitcomb Fund.

CABBAGES. — Three Drumhead, trimmed:

First, George D. Moore	3 00
Second, C. L. Hartshorn	2 00

BEANS. — Cranberry, half-peck:

First, Joshua C. Stone	3 00
Second, Samuel Hartwell	2 00

TOMATOES. — Open culture, twelve specimens:

First, C. L. Hartshorn	3 00
Second, W. N. Craig	2 00

Gratuities: —

Hon. Aaron Low, Potatoes	1 00
Warren Heustis & Son, Collection	1 00
W. N. Craig, "	1 00

JULY 16.

POTATOES. — Twelve specimens:

First, C. L. Hartshorn	3 00
Second, Francis Blake	2 00
Third, Hon. Aaron Low	1 00

LETTUCE. — Tennisball, four heads:

First, Warren Heustis & Son	2 00
Second, George D. Moore	1 00

Any other variety:
First, C. L. Hartshorn 2 00
PEAS. — Stratagem, half-peck:
First, I. E. Coburn 3 00
Second, C. L. Hartshorn 2 00
Any other variety:
First, E. C. Lewis, Carter's Daisy 3 00
Second, E. C. Lewis, Perfection 2 00
Third, I. E. Coburn, Queen 1 00
SWEET CORN. — Twelve ears:
First, Joshua C. Stone 3 00
Second, Sumner Coolidge 2 00
TOMATOES. — Open culture, twelve specimens:
First, C. L. Hartshorn, Acme 3 00
Second, Mrs. E. M. Gill, Stone 2 00
Third, Mrs. A. W. Blake 1 00

Gratuities: —
Hon. Aaron Low, Potatoes 1 00
Warren Heustis & Son, Collection 2 00
George D. Moore, " 2 00
W. N. Craig, " 1 00

JULY 23.

POTATOES. — Any variety, twelve specimens:
First, Francis Blake 3 00
Second, C. C. Marble 2 00
Third, Hon. Aaron Low 1 00
SWEET CORN. — Crosby, twelve ears:
First, Joshua C. Stone 3 00
Second, Samuel Hartwell 2 00
TOMATOES. — Twelve specimens:
First, Mrs. A. W. Blake 3 00
NATIVE MUSHROOMS. — Named collection of not less than five edible varieties:
First, Miss Ellen W. Rumrill 4 00
Second, Aldersey Clark 3 00
Third, Miss Alice L. Grinnell 2 00

Gratuities: —
George B. Gill, Golden Wax Beans 1 00
E. C. Lewis, Collection 2 00
Hon. Aaron Low, " 1 00
George Pfeiffer, " 1 00
Warren Heustis & Son, Collection 1 00

JULY 30.

BEANS. — Goddard, two quarts, shelled:	
First, Warren Heustis & Son	3 00
Horticultural, two quarts, shelled:	
First, Joshua C. Stone	3 00
TOMATOES. — Comrade, twelve specimens:	
First, Arthur F. Coolidge	3 00
Second, Joshua C. Stone	2 00
Stone:	
First, Arthur F. Coolidge	3 00
Second, Mrs. E. M. Gill	2 00
Any other variety:	
First, C. L. Hartshorn, Acme	3 00
Second, Arthur F. Coolidge, Puritan	2 00
Third, Joshua C. Stone, Atlantic	1 00
EGG PLANTS. — Round Purple, four specimens:	
First, H. R. Kinney	3 00
Second, Joshua C. Stone	2 00
Third, Arthur F. Coolidge	1 00
Gratuities: —	
Warren Heustis & Son, Collection	2 00
E. C. Lewis, "	2 00
Arthur F. Coolidge, "	1 00
Hon. Aaron Low, "	1 00

AUGUST 6.

GREEN-FLESH MELONS. — Four specimens:	
First, C. L. Hartshorn	3 00
SWEET CORN. — Twelve ears:	
First, Sumner Coolidge	3 00
Second, Joshua C. Stone, Hybrid	2 00
Third, Joshua C. Stone, Crosby	1 00
EGG PLANTS. — Round Purple, four specimens:	
First, Joshua C. Stone	2 00
Second, Sumner Coolidge	1 00
Gratuities: —	
Samuel Hartwell, Sweet Corn	1 00
Hon. Aaron Low, Peas and Potatoes	1 00
G. S. Gray, Mushrooms	1 00
Warren Heustis & Son, Collection	1 00

AUGUST 13.

POTATOES. — Any variety, twelve specimens:	
First, C. L. Hartshorn	3 00
Second, C. C. Marble	2 00
Third, Hon. Aaron Low	1 00

ONIONS. — Twelve specimens:

First, W. N. Craig, Danvers	3 00
Second, George D. Moore	2 00
Third, W. N. Craig, Weathersfield	1 00

GREEN-FLESH MELONS. — Four specimens:

First, Arthur F. Coolidge	3 00

SALMON FLESH MELONS. — Any variety, four specimens:

First, Varnum Frost	3 00

CELERY. — Four roots of any variety:

First, Arthur F. Coolidge	3 00
Second, Warren Heustis & Son	2 00
Third, Frederick Tetlow	1 00

BEANS. — Large Lima, two quarts:

First, Warren Heustis & Son	3 00

Goddard, Two quarts, shelled:

First, Warren Heustis & Son	3 00
Second, C. L. Hartshorn	2 00
Third, Rev. Calvin Terry	1 00

SWEET CORN. — Potter's Excelsior, twelve ears:

First, Warren Heustis & Son	3 00
Second, Sumner Coolidge	2 00
Third, Hon. Aaron Low	1 00

Any other variety:

First, Samuel Hartwell	3 00
Second, Joshua C. Stone	2 00
Third, C. L. Hartshorn	1 00

PEPPERS. — Squash, twelve specimens:

First, George Lincoln	3 00
Second, Arthur F. Coolidge	2 00
Third, Hon. Aaron Low	1 00

Any other variety:

First, C. L. Hartshorn	3 00
Second, Joseph Thorp	2 00

Gratuities: —

Warren Heustis & Son, Collection	2 00
W. N. Craig, "	2 00
E. C. Lewis, "	2 00
Arthur F. Coolidge, "	2 00
Hon. Aaron Low, "	1 00

AUGUST 20.

GREEN-FLESH MELONS. — Four specimens:

First, Arthur F. Coolidge	3 00
Second, Joshua C. Stone	2 00

SALMON-FLESH MELONS. — Four specimens:

First, Varnum Frost	3 00

WATERMELONS. — Pair:	
First, E. C. Lewis	3 00
CABBAGES. — Three of any variety, trimmed:	
First, C. L. Hartshorn	3 00
Second, Warren Heustis & Son, Succession	2 00
Third, Warren Heustis & Son, All Seasons	1 00
CELERY. — Four roots:	
First, Arthur F. Coolidge	3 00
Second, Warren Heustis & Son	2 00
BEANS. — Large Lima, two quarts:	
First, C. L. Hartshorn	3 00
Second, Warren Heustis & Son	2 00
Dwarf Lima:	
First, Warren Heustis & Son	3 00
Second, C. L. Hartshorn	2 00
MARTYNIAS. — Twelve specimens:	
First, E. C. Lewis	2 00
Second, E. S. Converse	1 00
NATIVE MUSHROOMS. — Named collection, of not less than five edible varieties:	
First, G. A. Clark	3 00
Second, Miss Ellen W. Rumrill	2 00
Gratuities: —	
W. N. Craig, Collection of Tomatoes	2 00
Arthur F. Coolidge, Collection	2 00
I. E. Coburn, "	1 00
Hon. Aaron Low, "	1 00

AUGUST 27.

Gratuities: —	
Warren Heustis & Son, Celery	1 00
C. E. Richardson, Cucumbers	1 00

SEPTEMBER 3.

Gratuity: —	
Warren Heustis & Son, Celery	1 00

SEPTEMBER 10.

TURNIPS. — Twelve Flat:	
First, E. C. Lewis	3 00
Second, F. J. Kinney	2 00
Third, C. L. Hartshorn	1 00
GREEN-FLESH MELONS. — Four specimens:	
First, E. C. Lewis	3 00
Second, Arthur F. Coolidge	2 00
Third, I. E. Coburn	1 00

SALMON-FLESH MELONS. — Four specimens:	
First, Hon. Aaron Low	3 00
Second, E. C. Lewis	2 00
Third, C. L. Hartshorn	1 00
WATERMELONS. — Two specimens:	
First, E. C. Lewis	3 00
Second, E. C. Lewis	2 00
Third, Hon. Aaron Low	1 00
CAULIFLOWERS. — Four specimens:	
First, De Souza Brothers	3 00
LETTUCE. — Any variety, four heads:	
First, Warren Heustis & Son	3 00
Second, C. L. Hartshorn	2 00
Third, Sumner Coolidge	1 00
CELERY. — Any variety, four roots:	
First, Warren Heustis & Son	3 00
Second, Arthur F. Coolidge	2 00
Third, C. L. Hartshorn	1 00
PARSLEY. — Two quarts:	
First, C. L. Hartshorn	2 00
Second, W. N. Craig	1 00
BEANS. — Large Lima, two quarts:	
First, C. L. Hartshorn	3 00
Second, William Christie	2 00
Third, Mrs. E. M. Gill	1 00
CORN. — Sweet, Potter's Excelsior, twelve ears:	
First, E. C. Lewis	3 00
Second, O. R. Robbins	2 00
Third, Joshua C. Stone	1 00
Any other sweet variety:	
First, O. R. Robbins	3 00
Second, E. C. Lewis	2 00
Third, C. L. Hartshorn	1 00
EGG PLANTS. — Round purple, four specimens:	
First, C. L. Hartshorn	3 00
Second, H. R. Kinney	2 00
Third, Arthur F. Coolidge	1 00
TOMATOES. — Three varieties, twelve specimens each:	
First, I. E. Coburn	5 00
Second, Arthur F. Coolidge	4 00
Third, Mrs. A. W. Blake	3 00
Aristocrat, twelve:	
First, Varnum Frost	3 00
Second, Hon. Aaron Low	2 00
Third, Arthur F. Coolidge	1 00
Comrade:	
First, Varnum Frost	3 00

Second, Francis Blake	2 00
Third, Hon. Aaron Low	1 00
May's Favorite:	
First, Varnum Frost	3 00
Second, Francis Blake	2 00
Third, Mrs. A. W. Blake	1 00
Any other variety:	
First, Varnum Frost, Stone	3 00
Second, Francis Blake	2 00
Third, H. R. Kinney	1 00
MARTYNIAS. — Twelve specimens:	
First, E. C. Lewis	2 00
Second, Hon. Aaron Low	1 00
OKRA. — Twelve specimens:	
First, E. C. Lewis	2 00
Second, E. C. Lewis	1 00
PEPPERS. — Squash, twelve specimens:	
First, Hon. Aaron Low	2 00
Second, Arthur F. Coolidge	1 00
Any other variety:	
First, E. C. Lewis	2 00
Second, C. L. Hartshorn	1 00
Gratuities: —	
E. C. Lewis, Collection of Melons	2 00
Arthur F. Coolidge, Collection	2 00
W. N. Craig, "	2 00
Hon. Aaron Low, "	2 00
George D. Moore, "	1 00
Warren Heustis & Son, "	1 00

SEPTEMBER 17.

Gratuities: —	
Warren Heustis & Son, Celery	1 00
James Comley, Tomatoes	1 00
Hon. Aaron Low, Melons	1 00

SEPTEMBER 24.

Gratuities: —	
Warren Heustis & Son, Lettuce	1 00
Hon. Aaron Low, Melons	1 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

SEPTEMBER 29 AND 30.

BEETS. — Turnip Rooted, twelve:	
First, Varnum Frost	3 00
Second, Joshua C. Stone	2 00
Third, C. L. Hartshorn	1 00

CARROTS. — Long Orange, twelve:	
First, H. R. Kinney	3 00
Second, Walter Warburton	2 00
Third, E. C. Lewis	1 00
Intermediate:	
First, H. R. Kinney	3 00
Second, Varnum Frost	2 00
Third, Walter Warburton	1 00
PARSNIPS. — Long, twelve:	
First, C. L. Hartshorn	3 00
Second, George D. Moore	2 00
Third, Varnum Frost	1 00
POTATOES. — Four varieties, twelve specimens each:	
First, F. J. Kinney	5 00
Second, Mrs. Mary T. Goddard	4 00
Third, E. C. Lewis	3 00
Carman No. 1:	
First, Mrs. Mary T. Goddard	3 00
Second, Hon. Aaron Low	2 00
Clark:	
First, F. J. Kinney	3 00
Second, Hon. Aaron Low	2 00
Third, Mrs. Mary T. Goddard	1 00
Hebron:	
First, H. R. Kinney	3 00
Second, F. J. Kinney	2 00
Third, C. L. Hartshorn	1 00
Rose:	
First, H. R. Kinney	3 00
Second, Mrs. Mary T. Goddard	2 00
Third, B. J. De Souza	1 00
Any other variety:	
First, F. J. Kinney, Somerset	3 00
Second, Arthur Nixon	2 00
Third, Mrs. Mary T. Goddard	1 00
SALSIFY. — Twelve specimens:	
First, Warren Heustis & Son	3 00
Second, E. C. Lewis, Sandwich Island	2 00
Third, E. C. Lewis, Breck's Improved	1 00
TURNIPS. — Flat, twelve:	
First, F. J. Kinney	3 00
Second, George F. Wheeler	2 00
Third, E. C. Lewis	1 00
Swedish:	
First, C. L. Hartshorn	3 00
Second, F. J. Kinney	2 00
Third, E. C. Lewis	1 00

ONIONS. — Danvers, twelve:	
First, Charles F. Curtis	3 00
Second, W. N. Craig, Globe	2 00
Third, W. N. Craig, Flat Danvers	1 00
Red:	
First, W. N. Craig	3 00
Second, Mrs. Mary T. Goddard	2 00
Third, C. L. Hartshorn	1 00
White:	
First, W. N. Craig	2 00
Second, E. C. Lewis	1 00
Any other variety:	
First, W. N. Craig, Ailsa Craig	3 00
Second, W. N. Craig, Prize Taker	2 00
Third, Mrs. Mary T. Goddard, Prize Taker	1 00
SQUASHES. — Bay State, three:	
First, Hon. Aaron Low	3 00
Second, Sumner Coolidge	2 00
Third, E. C. Lewis	1 00
Hubbard:	
First, Varnum Frost	3 00
Second, Joshua C. Stone	2 00
Third, Arthur F. Coolidge	1 00
Hybrid Turban:	
First, E. C. Lewis	3 00
Marblehead:	
First, E. C. Lewis	3 00
Second, C. L. Hartshorn	2 00
Third, Mrs. Mary T. Goddard	1 00
Marrow:	
First, Varnum Frost	3 00
Second, C. L. Hartshorn	2 00
Third, Arthur F. Coolidge	1 00
Any other variety:	
First, C. L. Hartshorn, Warren	3 00
Second, Hon. Aaron Low	2 00
Third, Hon. Aaron Low, Plymouth Rock	1 00
CUCUMBERS. — White Spine, pair:	
First, E. M. Bruce	3 00
Second, William Doran & Son	2 00
Any other variety:	
First, Daniel T. Curtis	3 00
Second, Hon. Aaron Low	2 00
MELONS, GREEN-FLESH OR SALMON-FLESH. — Four specimens:	
First, Hon. Aaron Low, Emerald Green	3 00
Second, E. C. Lewis	2 00
Third, Hon. Aaron Low, Christiana	1 00

WATERMELONS. — Two specimens:

First, E. C. Lewis	3 00
Second, Hon. Aaron Low	2 00
Third, E. C. Lewis	1 00

BRUSSELS SPROUTS. — Half-peck:

First, C. L. Hartshorn	3 00

CABBAGES. — Drumhead, three:

First, Mrs. Mary T. Goddard	3 00
Second, C. L. Hartshorn	2 00
Third, E. C. Lewis	1 00

Red:

First, Mrs. Mary T. Goddard	3 00

Savoy:

First, Mrs. Mary T. Goddard	3 00
Second, E. C. Lewis	2 00
Third, Joshua C. Stone	1 00

CAULIFLOWERS. — Four specimens:

First, B. J. De Souza	5 00
Second, Samuel Hartwell	4 00
Third, C. M. Handley	3 00

CELERY. — Paris Golden, four roots, best kept during the exhibition:

First, Warren Heustis & Son	5 00
Second, C. L. Hartshorn	4 00
Third, Arthur F. Coolidge	3 00

Any other variety:

First, E. M. Bruce, Pearl	5 00
Second, Warren Heustis & Son, Pascal	4 00
Third, C. L. Hartshorn, Pascal	3 00

ENDIVE. — Four specimens:

First, H. R. Kinney	3 00
Second, C. L. Hartshorn	2 00
Third, E. C. Lewis	1 00

LETTUCE. — Four heads:

First, Warren Heustis & Son	3 00
Second, George D. Moore	2 00
Third, Sumner Coolidge	1 00

PARSLEY. — Two quarts:

First, W. N. Craig	2 00
Second, C. L. Hartshorn	1 00

HORSE-RADISH. — Six roots, present year's growth:

First, H. R. Kinney	2 00

CORN. — Yellow, or Field, twenty-five ears, traced:

First, Elliott Moore, eight rowed	3 00
Second, Elliott Moore, twelve rowed	2 00

Sweet, twelve ears:

First, O. R. Robbins	3 00
Second, Arthur F. Coolidge	2 00
Third, E. C. Lewis	1 00

EGG PLANTS. — Round Purple, four:	
First, C. L. Hartshorn	3 00
Second, Arthur F. Coolidge	2 00
Third, Sumner Coolidge	1 00
TOMATOES. — Three varieties, twelve specimens each:	
First, Arthur F. Coolidge	5 00
Second, H. R. Kinney	4 00
Third, Francis Blake	3 00
Aristocrat:	
First, Varnum Frost	3 00
Second, Arthur F. Coolidge	2 00
Third, Hon. Aaron Low	1 00
May's Favorite:	
First, E. M. Bruce	3 00
Second, Hon. Aaron Low	2 00
Third, Francis Blake	1 00
Stone:	
First, H. R. Kinney	3 00
Second, Thomas Appleford	2 00
Third, Arthur F. Coolidge	1 00
Any other variety:	
First, James Comley, New Champion	3 00
Second, A. T. Brown, Buckeye	2 00
Third, Arthur F. Coolidge, Comrade	1 00
PEPPERS. — Squash, twelve specimens:	
First, George Lincoln	3 00
Second, Hon. Aaron Low	2 00
Third, C. L. Hartshorn	1 00
Any other variety:	
First, C. L. Hartshorn, Ruby King	3 00
Second, Hon. Aaron Low, "	2 00
Third, E. C. Lewis, "	1 00
CULINARY HERBS. — Collection, named:	
First, W. N. Craig (green)	5 00
Second, C. L. Hartshorn (dried)	4 00
NATIVE MUSHROOMS. — Named collection, not less than five edible varieties (postponed from September 10):	
First, Hollis Webster	3 00
Second, Miss Ellen W. Rumrill	2 00

Gratuities: —

Hon. Aaron Low, Collection of Potatoes	5 00
V. B. Hersom, Squashes	2 00
George E. Richardson, Gourds	1 00
Thomas Appleford, Collection of Corn	1 00
Mrs. Mary T. Goddard, Lima Beans	2 00
Thomas Appleford, " "	1 00

Mrs. E. M. Gill, Lima Beans	1 00
Warren Heustis & Son, Collection	5 00
W. N. Craig, "	5 00
E. C. Lewis, "	2 00
George D. Moore "	1 00

OCTOBER 8.

Gratuities: —

George D. Moore, Lettuce and Celery	2 00
Warren Heustis & Son, Celery	1 00

OCTOBER 15.

Gratuity: —

Warren Heustis & Son, Collection	2 00

OCTOBER 22.

Gratuities: —

Mrs. E. M. Gill, Lima Beans	1 00
Charles W. Parker, Sweet Potatoes and Peanuts	1 00
George D. Moore, Collection	1 00

OCTOBER 29.

Gratuity: —

Warren Heustis & Son, Collection	2 00

EXHIBITION OF WINTER FRUITS AND VEGETABLES.

NOVEMBER 5.

PARSNIPS. — Twelve specimens:	
First, C. L. Hartshorn	3 00
Second, George D. Moore	2 00
Third, Arthur Nixon	1 00
CABBAGES. — Red, three specimens, trimmed:	
First, C. L. Hartshorn	3 00
Second, Mrs. Mary T. Goddard	2 00
Third, Walter Warburton	1 00
Savoy:	
First, J. C. Stone	3 00
Second, E. C. Lewis	2 00
Third, C. L. Hartshorn	1 00
BRUSSELS SPROUTS. — Half-peck:	
First, E. S. Converse	3 00
Second, C. L. Hartshorn, Improved	2 00
Third, C. L. Hartshorn, Paris Market	1 00
CAULIFLOWERS. — Four specimens:	
First, De Souza Brothers	3 00
Second, C. M. Handley	2 00
Third, E. C. Lewis	1 00

CELERY. — Four roots:	
First, Warren Heustis & Son	3 00
Second, George D. Moore	2 00
Third, Arthur F. Coolidge	1 00
LETTUCE. — Four heads:	
First, Joshua C. Stone	3 00
Second, Warren Heustis & Son	2 00
Third, George D. Moore	1 00
TOMATOES. — Twelve specimens, grown under glass:	
First, William C. Winter	3 00
Second, Francis Blake, Best of All	2 00
Third, Francis Blake, Essex	1 00
Gratuities: —	
Mrs. Mary T. Goddard, Collections of Potatoes	2 00
Hon. Aaron Low, Collection of Squashes	2 00
L. H. Heustis, Squashes	1 00
James L. Duncan, Crosnes (*Stachys affinis*)	1 00
E. C. Lewis, Collection	4 00
Arthur Nixon, "	3 00
Warren Heustis & Son, Collection	2 00

NOVEMBER 12.

Gratuity: —	
Warren Heustis & Son, Celery	1 00

NOVEMBER 19.

Gratuities: —	
Hon. Aaron Low, Turnips	1 00
George D. Moore, Lettuce	1 00
George M. Anderson, Mushrooms	1 00

NOVEMBER 26.

Gratuity: —	
Warren Heustis & Son, Collection	1 00

DECEMBER 17.

Gratuity: —	
Warren Heustis & Son, Celery	1 00

CHARLES N. BRACKETT,
CEPHAS H. BRACKETT,
VARNUM FROST,
WARREN H. HEUSTIS,
P. G. HANSON,
WALTER RUSSELL,
AARON LOW,
} *Committee on Vegetables.*

REPORTS

OF THE

COMMITTEE ON GARDENS,

FOR THE YEARS 1897 AND 1898.

By PATRICK NORTON, CHAIRMAN.

REPORT FOR 1897.

[The accounts of the visits to the houses and grounds of Messrs. Nicholson, the Bussey Institution, Mr. Nevins, the Hayes estate, and Mrs. Cheney were prepared by Azell C. Bowditch, who acted as Chairman of the Committee at the time those places were visited.]

The year 1897, just closed, has been one of unusual activity with your Committee, as more calls for visits have been made than during the year just preceding. The applications during the first half of the year were but few, but as the summer advanced they came in so fast that we were quite busy till late into the fall.

We noticed on some of the places visited changes in the mode of planting. Hardy herbaceous and other flowering plants were more freely used than coleuses and other foliage plants, thereby giving more beauty to the landscape than the foliage alone. This, we think, is to be commended.

WILLIAM NICHOLSON & SON'S CARNATION HOUSES, FRAMINGHAM.

On March 18 we were invited to visit the carnation houses of William Nicholson and Son at Framingham. The particular house which they entered for the prize for the best carnation house is eighty-seven feet long by twenty-five feet wide. The carnations were in splendid condition, fully flowered, and showed by their

appearance that they received the very best of care and fully responded to it. As this class of plants is a specialty with this firm, all the promising new varieties are tried as soon as procurable, with a view to having the best in cultivation. They have been successful cultivators of the carnation.

While we were looking at the Messrs. Nicholson's carnations our attention was called to a house of tomatoes just coming into fruit. It was the finest house of tomatoes your Committee had ever seen. The Messrs. Nicholson were justly proud of their tomato house, and well they might be, for the financial result was very pleasing after the abundant crop was marketed. It was noticed that all the houses were uncommonly neat for commercial houses.

Bussey Institution of Harvard University, Jamaica Plain.

This was the next place visited, on March 27. Charles Jackson Dawson conducted us through the greenhouses, and explained as we passed along that the object of forcing hardy plants was to determine the length of time it would take to bring them into bloom from the dormant state, and also to have them in readiness for use in the school of botany. The plants were treated in three classes, viz., shrubs, herbaceous plants, and bulbs; and Mr. Dawson's letter in the Transactions of the Society for 1896 fully explains the whole matter.

David Nevins's Estate, South Framingham.

On the 15th of June we again visited this estate, which is entered for the Hunnewell Triennial Prize. As it is fully described in the report of last year, we will not take up time and space in going over the same ground again. We noticed on this visit that extensive improvements had been made, such as the transplanting of a great number of large elms and evergreens, which will in time add very much to the landscape effect.

The Francis B. Hayes Estate, Lexington.

Our next visit was to the Hayes estate in Lexington, on the 16th of June. This estate is in charge of James Comley, who has been superintendent of it from the time when Mr. Hayes came into possession. It received, some years ago, the

first Hunnewell Triennial Prize, but today it is yet more worthy of that prize, as with the lapse of time the beautiful shrubs and trees then planted have gone on towards perfection, and it now presents to the visitor a most charming sight. Mr. Comley has by judicious management and combination planting of shrubs and trees made this place a model of beauty for others to copy.

Mrs. Benjamin P. Cheney's Estate, Wellesley.

On the 2d of July we visited the large estate of Mrs. B. P. Cheney, just south of Wellesley. This estate has been so fully described in former reports of this Committee that it would be needless to repeat what has been said. It is a charming place, containing several hundred acres of land nearly surrounded by the Charles River, with fine driveways through the natural forests in every direction, making a carriage drive on this place much more enjoyable than on any public highway, even in the beautiful town of Wellesley.

Arthur F. Estabrook's Estate, Beach Bluff.

This estate is entered for the Hunnewell Triennial Prize, and this was our first visit. The place is a new one, situated on the corner of Phillips and Atlantic avenues; it is elevated land, and the elegant house overlooks the ocean. The grounds are judiciously planted with trees, shrubs, and flowers, and will in a few years present a charming appearance. We shall visit this place with renewed pleasure in the future, as we are confident it will continue to improve in beauty as the trees, etc., develop towards perfection.

Warren H. Heustis and Son's Vegetable Farm, Belmont.

This place was visited on the 15th of August. It is devoted to the growing of vegetables and fruits, and the raising of pigs. Mr. Heustis is an enthusiastic farmer and successful in his undertakings. On this farm originated the Belmont strawberry, which still holds its own place for size and excellence, equal to that of any other.

George A. Nickerson's Grape House, Dedham.

We were invited to visit this house on the 26th of August. It is

a large curvilinear-roofed house fully one hundred feet long by twenty-five feet wide, and is filled with grapevines. They were in a thrifty condition and in full bearing. The bunches were very even — none extremely large, but well-colored and carrying a fine bloom. The varieties are Black Hamburg, Muscat of Alexandria, Buckland Sweetwater, Bowood Muscat, Golden Hamburg, and others. We congratulate Mr. David Monteith, the gardener, on his success as a grape grower.

Sumner and Frank E. Coolidge's Farm, Mount Auburn.

Our next visit was to the Coolidge Farm, at Mount Auburn. This farm contains about one hundred acres mostly devoted to growing vegetables for the market. There are employed during the summer about one hundred Italians as laborers. Everything pertaining to the carrying on of the place is performed on the premises, and during the busiest seasons of the year seven teams are employed daily to carry the products to market. The proprietors have established a large irrigating plant, which is fed from driven wells, and the water is carried by pipes all over the farm, thereby avoiding drought, and producing good crops in the dryest of seasons. Their enterprise is to be commended.

Col. Frederick Mason's Farm, Taunton.

On the 9th of September your Committee paid a visit to the farm of Col. Frederick Mason, in Taunton, to inspect the vegetable garden which was entered for the prize for the best Vegetable Garden. This garden covers about five acres, and all the vegetables seen in our markets and others often mentioned in books, but seldom seen, were growing in abundance and of very superior quality. Mr. E. C. Lewis, the efficient gardener, said he planted about one hundred kinds of vegetables, and from their appearance he evidently kept them in the highest condition till maturity. This was one of the most enjoyable excursions of the year, as we were brought in contact with the perfection of general gardening on a liberal scale.

Warren D. Hinds's Peach Orchard, Townsend.

On September 17 we visited the peach orchards of W. D. Hinds at Townsend, in the northern part of the State. We found the

trees generally in good condition, with a few exceptions where the yellows seem to have developed. Mr. Hinds told the Committee how reluctant he was to thin out sometimes nearly half the fruit on a tree, but he was learning by experience that large fruit sells itself every time, when if all the fruit is left on it never acquires the fine appearance of that which is left after thinning.

Fred R. Mathieson's Greenhouses, Waltham.

On October 12 we were invited to visit the spacious greenhouses of Fred R. Mathieson at Waltham. These are chiefly devoted to the growing of roses. We found the houses well filled with plants in the finest condition and well bloomed. It is very evident that Mr. Mathieson knows how to grow roses in the best possible manner, and he profits from observation while on visits of inspection far and near to houses devoted to the same flower. We congratulate Mr. Mathieson on the success attending his efforts.

The Lenox Horticultural Society.

The Lenox Horticultural Society having invited the Garden Committee of the Massachusetts Horticultural Society to visit that famous town for a few days of restful pleasure, we departed from Boston on an early train on the thirteenth day of October, and arrived at Pittsfield, which is six miles from Lenox, at about noon. A delegation met us at the railroad station, and we were immediately conducted to a hotel, where an excellent dinner awaited and prepared us for the pleasant duties we had to perform. The prominent estates we were expected to visit comprised some of the most extensive in the State, and instead of the two days we spent inspecting a few of them we should want a month to do the pleasant work to our satisfaction. A four-horse carriage was at our service during the whole time of our stay, and a banquet was given to us in the evening. Though the country round about is hilly it does not present a rugged aspect, but on the contrary these beautiful hills have a charm and beauty all their own, and attract the wealthy from all over the country to recuperate in the health-giving atmosphere of the old Berkshire hills, after having become exhausted by the demands of society in other haunts of pleasure during summer.

Some of the estates comprise thousands of acres, and are laid

out in the most judicious manner with fine roads and walks of great extent, thus making a great private park of fully twenty-five square miles, studded with private residences palatial in character, of remarkable beauty and grandeur. It would seem out of place for us to describe any one estate among so many, and we will therefore confine ourselves to remarks giving a general idea of the scenery and the careful efforts of the gardener and architect in making the place so beautiful. One point which struck the Committee was the very short time in which these beautiful grounds had been developed from ordinary farming lands. Millions of money have been expended in the gradual improvement of this beautiful country, and the present result is a collection of private residences and specimens of landscape gardening that cannot be equalled elsewhere in all New England. A large number of these beautiful places have come into existence in this remarkable town, and a good many more are projected, each new proprietor trying to excel every one else in the generous expenditure of wealth in the building of a country home and the ornamentation of the already beautiful grounds.

Every such place as those above described requires the care of a competent head gardener, as well as a sufficient number of foremen and assistants, and it is probable that nowhere else in this country can an equal number of highly educated and skilful gardeners be found. The Horticultural Society of Lenox is not large in numbers, but this is more than made up by the accomplishments of its members and their expansive hospitality in entertaining their friends, and our visit to Lenox will long be remembered as one of the most delightful that the Garden Committee has ever made. The natural beauty of the place in the autumnal season was indescribable, for all nature had put on its most gorgeous colors to welcome us, which, together with the extreme hospitality of the gardeners, made us wish that our future lives might be cast in such a pleasant place as Lenox, and in such agreeable society as we met with there.

It has been a problem with many of the members of the Massachusetts Horticultural Society, who desire its utmost usefulness, how its influence could be extended so that it should be a State Society in reality as well as in name, and it is hoped that this visit may lead to such an extension of its usefulness.

Edmund M. Wood & Co.'s Greenhouses, Natick.

The twenty-eighth of October found your Committee at Natick, visiting the extensive greenhouses of Edmund M. Wood & Co. One of the houses, one hundred and fifty feet long by twenty feet wide and fourteen feet high, was devoted to the growing of chrysanthemums. There were in this house about four thousand plants, grown to a single stem, in about thirty varieties of the very best kinds in existence. Mr. Montgomery, the gardener, tests all the newly introduced and highly extolled kinds to see whether they are adapted to his wants, and if he finds them of sufficient merit to warrant, he continues to grow them afterwards. By this mode of procedure his house is filled with only the very best and most marketable kinds. He plants them in the same soil that he uses for growing roses, being very particular about drainage, as they require plenty of water continually applied. When they require stimulating, he feeds with commercial fertilizers in such quantities as in his good judgment and experience they need. So we see that there is no fast and loose way of growing anything under glass, but to be successful one must have knowledge and experience.

David Nevins's Chrysanthemum House, South Framingham.

On the twenty-ninth of October we again visited the David Nevins estate, to view his house of chrysanthemums planted on benches. These plants were grown to one flower, and presented a very thrifty appearance. The flowers were very large and well finished, and reflected great credit on the gardener, Alexander McKay, for the care he bestowed while they were growing.

William Nicholson & Son's Chrysanthemum House.

On the same day we again visited William Nicholson & Son's estate, to view a house of chrysanthemums grown on benches. We were highly pleased with the exhibition, for the plants were grown for one to three blooms to a plant, thereby giving more blooms than if all were grown singly. The market value of these medium-sized blooms is nearly as great as that of the giant blooms, and a great many more of them can be sold. The house presented a charming appearance.

Mrs. Benjamin P. Cheney's Chrysanthemums.

On the thirtieth of October we visited Mrs. B. P. Cheney's beautiful home at Wellesley, to see her splendid show of chrysanthemums. Mr. John Barr, the gardener, said he had about eight hundred single-stem plants on benches, comprising fifty varieties, and sixty-five ten-inch pots of specimen plants in thirty varieties. These were all of the very best kinds known, and they were a most beautiful sight to behold. As chrysanthemums vary greatly in the time they come into bloom, it will be well, if one wants a large lot to come into bloom at a given time, to know exactly whether they are early or late bloomers, so that he may plant accordingly.

The Eliot School Children's Chrysanthemum Exhibition, South Natick.

An unusual exhibition of chrysanthemums was made on November 11, 12, and 13 by the children of the Eliot School at South Natick, to which the Garden Committee were invited. In June, 1897, at the instance of T. D. Hatfield, gardener to Walter Hunnewell, one hundred and fifty plants were given to the school children by him and other gardeners to care for, grow, and bloom, and in the fall to bring forward for the exhibition. The prizes were given in Holland bulbs for house culture during the winter. The first prizes were seventeen bulbs each; second prizes, twelve bulbs; and all others six bulbs each. The children wrote their experiences, giving the life history of their plants, including their struggles with insects, mildew, etc. There is no doubt that such experience is valuable to a child, as it has a tendency to inculcate carefulness in horticulture, and foster a taste for the noble art which may be prolonged during the whole life. The practice of school exhibitions is to be heartily commended, and Mr. Hatfield and the teachers deserve much credit for originating this exhibition, at once educational and beautiful.

David Nevins's Violets.

The next visit made was on the second of December, to the David Nevins estate to view frames of violets. These were grown during the summer in rich garden soil near a hedge running north and south, and, in the early fall, transplanted to the frames. They showed no fungous disease, but were pictures of health and

splendidly flowered. Mr. McKay, the gardener, told us that the soil was composed of old sods and decayed leaves and very old manure, which produces a natural, cool soil, just such as the violet likes. He is very successful in their cultivation.

Sumner Coolidge's Violets.

On December 23 we visited the farm of Sumner Coolidge, to consider two houses of violets, one of Marie Louise, and the other Lady Hume Campbell. The plants had been placed in the ground the same as lettuce is planted. They were not in that very vigorous condition in which we like to see violets grown, but they were giving a large quantity of bloom of second quality, which supplied a certain demand. Violets, to produce fine blooms, must be grown luxuriantly, and they will sell on sight and command good prices.

The prizes and gratuities awarded during the year were as follows:

Special Prize from the John A. Lowell Fund.

For the best house of Chrysanthemums arranged for effect with other plants:	
First, Mrs. B. P. Cheney	$50 00

Society's Prizes.

For the best house of Foreign Grapes:	
First, George A. Nickerson	40 00
For the best house of Chrysanthemums grown on benches:	
First, Edmund M. Wood & Co.	50 00
Second, David Nevins	30 00
For the best bench or frames of Violets:	
First, David Nevins	40 00
Second, Sumner Coolidge	20 00
For the best Carnation house:	
First, William Nicholson & Son	40 00
For the best Fruit Garden:	
First, Warren D. Hinds	50 00
For the best Vegetable Garden:	
First, Col. Frederick Mason	50 00
Second, Sumner Coolidge	30 00

Gratuities.

Fred R. Mathieson, for Rose houses	25 00
James Comley, for frames of Russian Violets	20 00
Bussey Institution, for Spring Flowers	20 00
William Nicholson & Son, for house of Tomatoes	20 00
Eliot School, South Natick, for Chrysanthemums in pots	15 00

Amount appropriated		$500 00
Awarded for prizes	$400 00	
Awarded for gratuities	100 00	
		$500 00

Respectfully submitted,

PATRICK NORTON,
AZELL C. BOWDITCH,
J. WOODWARD MANNING,
E. W. WOOD,
CHARLES N. BRACKETT,
JOSEPH H. WOODFORD,
HENRY W. WILSON,
JACKSON DAWSON,
Committee on Gardens.

REPORT FOR 1898.

The year which has just closed has been, like the preceding, one of unusual activity for your Committee, for all the prizes in the Schedule have been competed for, and your Committee have made twenty-one visits to different places to view the results of intelligent horticulture as practised at the various places.

The David Nevins Estate, South Framingham.

In the year 1896 David Nevins, of South Framingham, entered his estate for the Hunnewell Triennial premium. This place has been visited twice a year since, the last visit occurring in November of this year. It consists of some five hundred acres, the greater portion of which is laid down to grass, but the area surrounding the mansion house, comprising about seventy-five acres, is kept in a superb closely shaven lawn interspersed with groups of trees, shrubs, and flower beds. Messrs. Ernest W. and James H. Bowditch were the landscape architects, with the coöperation of Alexander McKay, the permanent and efficient gardener on the place.

The situation of this estate is very beautiful, as it is divided by the Metropolitan Water Works, formerly the Sudbury River, which runs northerly through the middle of it, and joins Farm Pond on the east, thereby making the place a splendid park with grand water views in every direction. The old stone walls and fences have all been removed, the clumps of native forests have all been cleared up, and the driveways all over the five hundred acres are in most perfect order, making this estate one of the most charming and beautiful in the Commonwealth. This estate is awarded the First Hunnewell Triennial prize of $160.

During the past year, while Mr. Nevins was in Europe, where he went with the hope of improving his health, he died, much to the regret of all who knew him. He was a genial and companionable gentleman, and will be greatly missed by his family and by all who knew him, in all stations in life. *Requiescat in pace!*

George D. Moore's Vegetable Farm, Arlington.

We also had the pleasure of visiting the farm of George D. Moore, at Arlington, on April 9 and July 26. This farm is entirely devoted to growing early and late vegetables, and several crops are taken from the same ground every year. Mr. Moore is a successful, hard-working farmer, applying experience and knowledge to accomplish good results in growing crops for market. His crops under glass as well as those outdoors were in fine condition, and deserved the award your Committee has made. We append Mr. Moore's letter explaining his mode of procedure.

Arlington, April 9, 1898.

Patrick Norton, Esq., *Chairman of Garden Committee:*

Dear Sir: In compliance with your request I herewith send you some statistics and explanations of our market-garden operations.

We have some nine hundred hotbed sashes, which we use almost exclusively in raising lettuce, getting two crops in a season. We raise the plants, which take six to eight weeks to grow to the required size in our smallest greenhouse. Our first crop we transplant to the sash in February. We prepare the beds in the usual way in the fall, covering them four or five inches deep with strawy horse manure to keep out the frost. We cover them with the sash and shutters before the heavy snows. When ready to use the beds we take the covering for banking the sides of the hotbeds, then beginning at one end of the bed we shovel out the soil eight or ten inches deep from two sashes and fill in with heat (horse manure) to the depth of seven or eight inches when thoroughly packed or trodden down, then shovel the soil from the next two sashes back on this heat, and so continue to the end of the bed, after which we put the sashes back over the bed, covering at night with mats and shutters. In two or three days the soil will have been warmed by the under heat sufficiently to receive the plants. We then fork over the soil, breaking it fine, after which we rake in thoroughly about two pounds of Stockbridge Lettuce Special Fertilizer to each sash; then we pat down the surface with the back of a snow shovel to break the little lumps on top and keep the surface from drying till the plants cover the ground. We usually sprinkle the surface with tobacco dust, which we think has

a tendency to prevent mildew and ward off the lice pest, so troublesome to hotbed and greenhouse crops.

The management of the glass after planting can only be learned by education and experience. We have three greenhouses, the largest containing fourteen thousand lettuce plants, the next ten thousand, and the smallest about eight thousand, set eight inches apart. We usually raise three crops of lettuce in the houses, setting the first in October and harvesting the last in April, after which the houses are planted to cucumbers. The raising of lettuce in the greenhouse differs little from that in the hotbeds, with the exception of the under heat, which, for lettuce, is not necessary, but for cucumbers we make trenches fifteen inches wide and the same depth, and eight feet apart. In these trenches we put about a foot of well packed or trodden heat (horse manure), then cover with soil, and in a day or two when the soil is well warmed from the under heat we set two plants in hills three feet apart. These plants have been raised in six-inch flower-pots and should be six or eight inches high when transplanted. We usually fertilize the soil with Bowker Vine Fertilizer, say two pounds to eighteen square feet.

As in the management of hotbeds, it requires education and experience to make the business a success. If you desire I will give you a description of our management of the outside farming in a future letter.

Very truly yours,
GEO. D. MOORE.

GEORGE MARSTON WHITIN'S VINERY, WHITINSVILLE.

On August 10 we were invited to visit the vinery of George Marston Whitin, at Whitinsville, in the town of Northbridge, in the southern part of the State. This house is quite spacious, and is divided by a partition in the middle so as to enable the gardener to force one-half the house earlier than the other half, thereby extending the time of ripening. The house presented a grand appearance, the great bunches of grapes hanging in wonderful profusion, well colored, and of fine quality. Mr. George McWilliam, the gardener, deserves great credit for producing year after year such abundant crops of delicious fruit, and without any injury to the vines. A portion of the crop will not be consumed till next spring, the house thus furnishing a most refreshing fruit for eight

or nine months in the year. We have the pleasure of appending hereto Mr. McWilliam's method of growing foreign grapes, which is very instructive and well worth studying.

WHITINSVILLE, Dec. 30, 1898.

Mr. P. NORTON, *Chairman of Garden Committee:*

DEAR SIR: The graperies of G. M. Whitin are two span-roofed houses running east and west and heated with hot water. The vines were planted in May, 1885, with plants raised from eyes put in small pots in February. The young vines reached the top of the house early in July, were cut back to near the ground in December, carried their first crop of fruit in 1887, and have matured a heavy crop each year since. The borders are all inside, the bottom being cemented. Over the cement is placed a covering of cobblestones for drainage. The soil used was green sod, turned grass-side down, with broken bricks, charcoal, and old plaster to keep the soil open and sweet. The only manure used was broken bone. The soil is from twenty-four to thirty inches deep.

The early house, when planted, was all Hamburgs, but since planting there have been some Madresfield Court and Mrs. Pince inarched into the Hamburgs. The south side of the late house was planted with Muscats; the north side was planted with Alicante and Lady Downes.

The vines are pruned in December, the vines and houses well cleaned, the loose soil on the surface removed and replaced with fresh soil and a little fine bone. There being no plants kept in the vineries from now to the first of March, they are kept as cold as possible, but not to freeze the water in the pipes. About March 1 the borders receive two or three good waterings, the house is kept closed, and the vines started. The temperature is increased as the vines begin to grow. When in flower the Hamburg house is kept at about sixty-five degrees at night; the Muscat house at about seventy. Ventilating is carefully attended to. The vines are syringed from starting until they come into flower, and once after flowering. The borders are kept well saturated with water in the growing season, but never allowed to get dry at any time. When the fruit is swelling weak liquid manure is given.

Yours sincerely,

GEO. MCWILLIAM.

Greenhouses and Grounds of J. S. Bailey, West Roxbury.

We were called upon to visit the greenhouses and grounds of Jason S. Bailey, West Roxbury, on August 4. This place is quite new, not having been under cultivation more than three years, and yet it gives one, on close inspection, the feeling that a much longer time would not be too great to bring the whole place into such perfection of culture, and perform such judicious planting of flowers, trees, and shrubs. William Donald, the gardener, deserves much credit for the effective manner in which he has used the abundant means at his disposal.

Arthur F. Estabrook's Estate, Beach Bluff.

In August your Committee visited the summer estate of A. F. Estabrook, at Beach Bluff. This estate is also entered for the Hunnewell Triennial premium, and this is the second year your Committee have inspected it. It comprises about four acres situated on a rise of ground overlooking the ocean. It is comparatively a new place, but has been reclaimed from what was within a few years nothing but a barberry pasture, but now presents a charming appearance, having been developed into a delightful summer home, such as any one would be delighted to occupy.

Estate of E. S. Converse, Malden.

August 24 your Committee were called to visit the old-fashioned estate of E. S. Converse, of Malden. The mansion is surrounded by fine old specimens of trees, giving the place an indescribable sense of comfort and restful enjoyment, and Mr. D. F. Roy, the efficient gardener, has been very successful in distributing among the trees such beautiful and large specimens of ornamental foliage and flowering plants as make the grounds very attractive. We were very glad to visit this place, as it is kept in complete order at all times and presents such a look of contentment that any one passing must desire to occupy one of the comfortable seats under the fine old trees and dream away a warm summer day in enjoyment.

Col. Frederick Mason's Riverside Farm, Taunton.

On September 8 we again visited Riverside Farm, at Taunton, to view the vegetable garden of Col. Frederick Mason. This farm is one of the best conducted in the State, and is managed by one of

the most efficient farmer-gardeners, Mr. E. C. Lewis. It is a pleasure to see intelligence displayed in the care of stock and the cultivation of the ground, and here you find it in perfection. Our party was composed of the Garden Committee and a few of the best market gardeners of Arlington, and we heard the commendation of experienced men as to the success of Mr. Lewis's mode of cultivation. It was a pleasure to have our judgment confirmed by such good authority as our near-by successful farmers of Arlington, and it was also pleasant to partake of the excellent products of such a farm, under the hospitality of the owner and gardener.

Samuel Hartwell's Gravenstein Farm, Lincoln.

On September 13 we went to Lincoln to inspect the orchards of Mr. Samuel Hartwell. Mr. Hartwell turns his attention principally to the growing of apples, of the best kinds. His Gravensteins were bearing most abundantly, and indeed nearly all his trees presented a splendid sight. The cultivation of an orchard, if carried on intelligently, is probably as lucrative a business as a farmer can pursue. Mr. Hartwell has been very successful with his trees, and we imagine his success is entirely owing to the fact that he knows exactly what a tree needs to make it produce an abundance of good fruit, and to the prompt supply of its needs. He has named his farm from the apple most largely cultivated there.

Warren D. Hinds's Orchards, Townsend.

In September your Committee were called to visit the W. D. Hinds place, at Townsend, in the northern part of the State. This visit was to inspect the orchards on this place, which were composed of apple, plum, and peach trees. We were highly pleased with Mr. Hinds's farm, which was situated on very high ground, a capital place for fruit-growing, as early and late frosts do not, generally, affect orchards on high elevations so badly as those situated on low or level ground. Mr. Hinds was very successful this year, showing full crops of excellent fruit. His crop of peaches was enormous, and his plums — the Japanese variety, Satsuma — were of large size and most excellent quality.

Mrs. Benjamin P. Cheney, Sr's., Chrysanthemum House, Wellesley.

On the 2d of November we visited Mrs. B. P. Cheney's place at Wellesley, to inspect a house of chrysanthemums in pots arranged for effect, with other plants interspersed, thus making a very beautiful display. Mr. John Barr, the efficient gardener, exercised great good taste in his decoration, and your Committee were highly gratified with what they saw.

The Nevins Estate, South Framingham.

On November 3 we were called upon again to visit the David Nevins estate to view violets in frames and chrysanthemums on benches. The violets were of superior quality, consisting of five kinds, very profusely flowered and perfectly healthy. They were grown during the summer on the east side of a hedge, in good rich soil, and did not develop any fungous disease during their growth. The chrysanthemums on benches were grown to a single flower, and were of superior excellence. Mr. Alexander McKay's method of growing these two plants is to be commended, and it was a pleasure to witness the success of so good a gardener.

Edmund M. Wood & Co.'s Conservatories, Natick.

Our next visit, which occurred November 1, was to the Waban Conservatories at Natick. They are conducted by Edmund M. Wood & Co. The object was to view chrysanthemums on benches, and a rose house. Every one who has been at these greenhouses is struck with the very cleanly way in which everything is grown. Great credit is due to the gardener-superintendent, Mr. Alexander Montgomery, for his skill and knowledge in the noble art of horticulture, for in these greenhouses, covering many acres, we find only the highest cultivation, and perfect success is the result of his knowledge. We were very highly pleased with the whole establishment.

J. S. Bailey's Chrysanthemum House, West Roxbury.

We were called, on November 4, to the beautiful estate of J. S. Bailey, at West Roxbury, to inspect a house of chrysanthemums arranged with other decorative plants to produce the most pleasing effect. The greenhouse was a circular one, with a stage

around the inside of the whole house, elevated just enough to allow visitors to look down on the magnificent plants and beautiful arrangement to the best advantage. The plants were admirably grown, and the arrangement was exquisite, reflecting great credit on Mr. Bailey and his efficient gardener, Mr. William Donald. The Committee were highly gratified with their visit to Mr. Bailey's hospitable mansion and his beautiful greenhouses.

E. N. PEIRCE & CO.'S GREENHOUSES, WALTHAM.

On November 8 your Committee were called upon to visit a commercial place owned by E. N. Peirce & Co., of Waltham. This place, in the winter and spring, is devoted to growing vegetables for the market, but in the fall is filled with chrysanthemums for the same purpose. Messrs. Peirce & Co. marketed about seventy-five thousand blooms this fall, and when we visited the houses they were a superb sight to behold; the blooms were fine, well-developed, and of good size. They were cutting at that time from one to three hundred dozen blooms per day, and were getting good prices for them. One day they cut five thousand blooms.

GEORGE MARSTON WHITIN'S ORCHID HOUSE, WHITINSVILLE.

We had a cordial invitation again to visit the greenhouses of George M. Whitin, at Whitinsville, on December 20, to inspect a house of Calanthes which were in full bloom. Mr. George McWilliam, the experienced and successful gardener, had arranged the orchids among beautiful foliage plants, and they presented a grand appearance. Over one hundred pans of Calanthes, called by Mrs. Whitin the "Christmas Orchid," averaging more than five spikes to a pan, were a most gorgeous sight. Dendrobiums, Cypripediums, etc., were interspersed, making a sight not often seen in this country, and which when seen is not soon forgotten. The hospitality of Mr. and Mrs. Whitin and family was profuse, and the visit will be long remembered by a large number of invited guests as one of the most delightful of the year.

We are very much pleased to give in Mr. McWilliam's own words his method of growing Calanthes, as follows:

WHITINSVILLE, Dec. 30, 1898.

MR. NORTON, *Chairman of Garden Committee:*

DEAR SIR: In reply to your request as to how we grow Calan-

thes I would say that those grown here are all deciduous varieties, as they are the best for cut flowers. They are grown in a low narrow house, and kept near the glass. The glass is kept lightly shaded, and in summer a roller blind is used over the shaded glass. They are grown in both pots and seed-pans, and they require good drainage. The soil used is turfy loam with the fine part shaken out, a little fine bone, dried cow manure or leaf soil, and sand being added. When first potted a little water is given until they are well rooted, when they receive water liberally, and a little liquid manure when the bulbs are swelling, withholding the manure water when they commence to flower, but giving clean water as long as the leaves are green. When the flowers are cut the plants are placed beneath a stage where there are no hot pipes, and the temperature is kept at nearly sixty degrees all the time. When growth commences the bulbs are shaken out, the old roots cut off, and the bulbs placed on sand and put up to the light until the new roots appear, when they are potted. To grow Calanthes well requires a warm house — not under sixty at night, but seventy is better.

I herewith hand you a list of the varieties of Calanthes grown here, for your report:

C. Veitchii, one plant, to compare with *superba*.

" " improved, one plant.

" " *superba*, many.

" " *compacta*, of which I am getting a good stock. The bulbs and flower spikes of this one are much shorter than those of the others; but there are equally as many flowers and as large, which makes them much closer on the spike. The flower is of a soft, pleasing color, but of course you saw them when here.

C. Sandhurstiana, of the same parentage.

C. Veitchii — quite distinct; it comes into flower a little later and is much deeper in color.

C. vestita luteo-oculata.

" " *rubro-oculata.*

" " *oculata gigantea.*

C. Regnieri, two varieties.

These last two varieties come into flower about the time the others are generally past.

Yours truly,

GEO. MCWILLIAM.

WILLIAM NICHOLSON & SON'S CARNATION HOUSES, FRAMINGHAM.

We were called on December 21 to visit the commercial greenhouses of William Nicholson & Son, at Framingham, to view their carnation houses. This firm is reaping the benefit of skilful and thorough methods of growing anything they undertake. There is no haphazard way of doing things here, but the careful experience of a good many years is applied, which produces success every time. It is a pleasure to see knowledge applied to horticulture, as it is practised on this place, for the result is always successful, and the purchasers of the product are always satisfied. The carnations were pictures of robust health, and very profusely bloomed.

SUMNER AND FRANK E. COOLIDGE'S GREENHOUSES, MOUNT AUBURN.

December 22 we visited a range of large greenhouses, belonging to Sumner and Frank E. Coolidge, at Mount Auburn. They were filled with violets, lettuce, etc. The violets had in the early fall been attacked with fungus, but when we saw them they appeared to be recovering, and would, later on, produce an abundant crop. The lettuce house contained sixteen thousand five hundred heads, in very fine condition, giving promise of a good result, as the plants were in nearly marketable sizes.

The prizes awarded this year are as follows:

H. H. Hunnewell Triennial Premiums.

For an estate of not less than three acres, which shall be laid out with the most taste, planted most judiciously, and kept in the best order for three consecutive years:

First, Mrs. David Nevins	$160 00

Special Prize from the John A. Lowell Fund.

For the best house of Chrysanthemums, arranged for effect, with other plants, in pots:

First, Jason S. Bailey	50 00
Second, Mrs. B. P. Cheney	30 00

Society's Prizes.

For the best house or houses of Chrysanthemums grown on benches:

First, Edmund M. Wood & Co.	40 00
Second, Mrs. David Nevins	30 00

For the best house of Foreign Grapes:	
First, George Marston Whitin	30 00
For the best house or frames of Violets:	
First, Mrs. David Nevins	30 00
For the best Carnation house:	
First, William Nicholson	30 00
For the best Vegetable Garden:	
First, Col. Frederick Mason	40 00
Second, George D. Moore	30 00
For the best house of Forced Vegetables:	
First, George D. Moore	40 00
Second, Sumner Coolidge	30 00
For the best house of Roses:	
First, E. M. Wood & Co.	40 00

Gratuities.

Jason S. Bailey, for Greenhouses and Grounds	25 00
E. S. Converse, " " " "	25 00
E. N. Peirce & Co., for Chrysanthemums	25 00
George Marston Whitin, for Orchid House	35 00
Samuel Hartwell, for Orchards	25 00
Warren D. Hinds, " "	25 00

Respectfully submitted,

PATRICK NORTON,
AZELL C. BOWDITCH,
J. WOODWARD MANNING,
E. W. WOOD,
CHARLES N. BRACKETT,
JOSEPH H. WOODFORD,
HENRY W. WILSON,
JACKSON DAWSON,

Committee on Gardens.

REPORT

OF THE

Committee on School Gardens and Children's Herbariums

FOR THE YEAR 1898.

By HENRY LINCOLN CLAPP, CHAIRMAN.

GEORGE PUTNAM SCHOOL GARDEN, ROXBURY.

The space used for a garden, 72 × 48 feet, is now so crowded with plants, mostly perennials, that additions have been nearly stopped for lack of room. Most of the one hundred and fifty species introduced have grown vigorously, and many must be thrown away, as usual, in the spring when the garden is put in order.

The pupils of the school have made much of sketching plants in various stages of growth in the garden. Beginning with the early spring flowers, they indicated in notebooks the interesting developments of leaf and flower buds, visiting the garden at intervals of two or three days, in fair weather, until the close of school in June.

The ferns have been studied by pupils of the ninth grade, as usual, ten species having been carefully observed during the three autumn months. Five more species, together with all the more interesting crosiers, will be studied in the spring.

Many pupils of the ninth grade have made fern gardens at home. One of these pupils, Cora L. Tiley, at the last exhibition took the

first premium for fifteen finely mounted specimens of ferns, and Clara M. Hathaway, a pupil of last year's class, was awarded a gratuity for eighteen excellent additions of ferns.

All pupils of the seventh grade have made a study of the composite flowers growing in the garden.

Among the eleven species of iris is *Iris Pseudacorus*, the beautiful yellow species of the English marshes. When it began to blossom last June each flower had the regular three falls and three standards. About ten days later every flower was found to have four falls and four standards. My attention was called to the phenomenon by Miss Huston of this Committee.

Next June it will be watched with much curiosity to see if the singular metamorphosis is repeated.

COMPOSITE FLOWERS. GEORGE PUTNAM SCHOOL GARDEN.

CHILDREN SKETCHING, GEORGE PUTNAM SCHOOL GARDEN.

CURTIS SCHOOL GARDEN, MEDFORD.

DEAR MR. DAVENPORT: In compliance with your request, I send you a partial report of our school-garden work this season. I fear I cannot give you a complete list of the plants added, as, not knowing you would wish for it, I have not kept one. We have, however, added quite a number of wild flowers, as in all our visits to the woods we try to bring some roots which we had not before. Among those added the past summer have been hepatica, two new varieties of violets, early milkweed, herb Robert, rhodora, *Polygala polygama*, tall buttercup, butterfly weed (from Martha's Vineyard), and knapweed. One or two of these were to replace others which were planted last year and failed to appear this spring; but most of them were additional to the list which I sent you last year. In the line of trees we have added a cut-leaved birch, a tulip tree, a walnut (donated by the janitor), a native maple, and a native horse-chestnut. The last two were objects of much interest, as the maple was brought from the woods by one of the children, and the horse-chestnut was

IRIS VERSICOLOR. GEORGE PUTNAM SCHOOL GARDEN.

found and dug up carefully (sprouted, nut and all, complete) by a little boy in the first grade. It gave a valuable lesson on germination and was looked at with added interest, coming as it did just after our lessons on germination illustrated by the bean, pea, etc.

The garden has been a great source of pleasure as well as instruction throughout the year. We have been able to use the material there in many of our nature and drawing lessons. From the early spring, when the children hailed with delight the first appearance of the bloodroot and the tiny coils of the maiden-hair, hardly a day has passed that some one has not come at recess or before school to tell me of some new development in "our garden," as they love to call it. *There*, it seems to me, is the great value of a school garden, in a locality like ours, at least. The children can watch the daily growth and development of the plant and appreciate its wonders so much more fully than by just picking a bunch of blossoms when out for a walk.

While trying all the time to add to our wild-flower collection, we have also devoted several beds to garden flowers. We had several new beds dug last fall ready for seeds in the spring. The planting was done by the children, as far as possible, and always with some class observing. The weeding (except during vacation, of course) was done by them, and I think you will agree with me that they did very nicely for such young children. They found the gathering of the seeds an interesting part of their October nature work, and so have had an excellent opportunity for observing the complete cycle of plant life from seed to seed again. We also planted cannas, dahlias, and gladioli, and these were used in the November lessons on bulbs, tubers, etc. In connection with the lessons on bulbs we planted a number for spring blooming.

The children have tried to keep the yard, as well as the garden, in a neat and orderly condition, and we have received many compliments upon their appearance. Nothing was disturbed through the long vacation, which, considering all things, is an indication of the influence of the garden upon those who pass it daily. At least, that is the way it seems to me.

We were greatly encouraged last year by the approval given us by your Committee and enabled thereby to do quite a little which we could not otherwise have done. Should the Committee see fit to aid us this year, it will be most gratefully appreciated, and, after consultation with you, used where it would seem to bring the best result.

Respectfully submitted,

AMY WHITMORE JONES,

Principal Curtis School.

TO MR. G. E. DAVENPORT.

SWAN SCHOOL GARDEN, MEDFORD.

DEAR MR. DAVENPORT: As requested, I send you a report of our school garden, and the use which the teachers and children have made of it during the year 1898.

As you know, our garden contains a large number of wild flowers, — which number we are always endeavoring to increase, — a large variety of ferns, and some trees and shrubs. We have also set apart one bed for garden flowers, such as geraniums, dahlias, etc., and another bed in which the children may plant seeds, and so observe from time to time the germination and growth of plants.

Our wild flowers are a great help to us in our nature study, and as the years roll by, and our garden develops more and more, it will become invaluable to the teachers and pupils.

We have, in our nature study, besides our talks with the children, directed most of our energy to the drawing and painting of the plants and flowers, feeling that the children in this way must make a thorough study of the growth of the same.

The care of the garden, except during the vacations, has devolved upon the children. The interest which they have shown in this, and the great care and knowledge exhibited in their weeding and caring for the beds, have certainly been encouraging.

We thank you for the interest which your Committee have shown us in the past, and trust we may merit the same in the future.

Respectfully submitted,

ROSE ATKINSON PLUNKETT.

BLOODROOT. GEORGE PUTNAM SCHOOL GARDEN.

SCHOOL GARDEN IN BATH, MAINE.

In 1896 a school garden was established in Bath, Me., by Miss Viola G. Hogan, one of the assistants in the High School. The janitor dug the ground and has occasionally furnished help when needed; but Miss Hogan, with the assistance of some of the pupils, has done all the work of stocking the garden and taking care of the plants. She has also borne the only expense thus far incurred, that of buying tags for labelling.

The garden now contains the following native flowering plants and ferns:

Antennaria plantaginifolia,
Aquilegia Canadensis,
Arisæma triphyllum,
Aster acuminatus,
" *cordifolius*,
" *diffusus*,
" *linariifolius*,
" *longifolius*,
" *macrophyllus*,
" *multiflorus*,
" *paniculatus*,
" *umbellatus*,
" *vimineus*,
Chimaphila umbellata,
Clintonia borealis,
Cypripedium acaule,
Dalibarda repens,
Gaultheria procumbens,
Geum rivale,
Hepatica triloba,
Houstonia cærulea,
Iris versicolor,
Linnæa borealis,
Medeola Virginiana,
Myosotis laxa,
Oakesia sessilifolia,
Polygonatum biflorum,
Pyrola rotundifolia,
Sarracenia purpurea,
Saxifraga Virginiensis,
Smilacina racemosa,
Solidago arguta,
" *bicolor*,
" *Canadensis*,
" *juncea*,
" *lanceolata*,
" *latifolia*,
" *nemoralis*,
" *puberula*,
" *rugosa*,
" *sempervirens*,
" *squarrosa*,
Streptopus roseus,
Symplocarpus fœtidus,
Trientalis Americana,
Viola blanda,
" *cucullata*,
" *rotundifolia*,
" *sagittata*.

FERNS.

Aspidium acrostichoides,
" *cristatum*,
" *marginale*,
" *Noveboracense*,
" *spinulosum*,
" " var. *intermedium*,
" *Thelypteris*,
Asplenium ebeneum,
" *Filix-fœmina*.
Botrychium ternatum,
Dicksonia pilosiuscula,
Onoclea sensibilis,
Osmunda cinnamomea,
" *Claytoniana*,
" *regalis*,
Phegopteris Dryopteris,
" *polypodioides*,
Polypodium vulgare.

Some plants have died, as they depend wholly on the atmosphere for moisture during the summer vacation, but these have easily been replaced.

Many of the pupils show great interest in observing the growth of the plants and in learning to distinguish the various species; and several have already made wild gardens of their own. The botany class, also, makes use of the flowers.

The establishment of this garden has been purely a labor of love, as Miss Hogan does not teach botany, that department being in charge of another teacher; and it presents a striking example of what one interested teacher can do, without asking for an appropriation of money or waiting to see if somebody else will give a large number of plants to begin with.

Why cannot other school gardens be started in the same spirit? It is the garden begun with a few plants and a great amount of interest on the part of the teacher which is destined to increase and flourish, and to inspire boys and girls with a genuine love for this delightful work.

CHILDREN'S GARDENS IN DAYTON, OHIO.

In Dayton, O., the National Cash Register Company has made a very successful attempt to improve the homes of residents of a district called South Park. Attention is given to the condition of the roadways, gutters, curbs, sidewalks, fences, trees, grassplots, dooryards, back yards, shrubbery, etc. The sum of two hundred dollars is offered in prizes, including

"I. PRIZES TO BOYS.

"Fifty dollars in gold for the best five vegetable gardens, to be divided as follows: $15, $12, $10, $8, and $5.

BOYS' GARDEN, SOUTH PARK, DAYTON, O.

"Open to not more than forty boys (ranging in age from 8 to 15 years, inclusive) residing in South Park and selected by the Mothers' Guild.

"The N. C. R. Company provided and ploughed the ground, furnished the seeds, and permitted the use of tools for the cultivation of the plats.

"II. Prizes to Boys and Girls.

"Fifty dollars in gold (same as in the preceding) for the best-kept five back yards — whether planted with flowers, vines, shrubbery, or grass, or devoted to vegetable garden.

"Open to all boys and girls in South Park."

"The Boys' Gardens.

"The Committee on Boys' Gardens referred to the interest which the experiment had attracted, not only in South Park, but throughout the city, and mentioned the fact that hundreds of people from all parts of the city had visited the gardens during the summer. This Committee gave frequent inspections during the growing season to the work done, and congratulated the boys very heartily upon their perseverance and the intelligence shown in the cultivation of the ground allotted them. The quantity of vegetables raised in these gardens, the Committee says, will compare favorably with the results attained by persons of more mature years and experience. The Committee also expressed gratification at

A FIRST-PRIZE WINNER, DAYTON, O.

the evidence in improvement in skill and judgment apparent in the work of the young gardeners as the months passed by."

This commendable work appears to have been started by Mr. J. H. Patterson, the president of the N. C. R. Company. Rev. Mr. Sinclair, in speaking of the enterprise, said, "We are getting to see that religion is not simply singing hymns and praying, but it is, as well, right living, with pleasant homes and clean yards. The only regret that I have is that the people throughout the city cannot see this audience and witness this scene. These views (of gardens and yards on exhibition in the chapel) ought to be on exhibition in every corner, and wake up the entire city.

"Mr. Patterson has his reward for this work. He may not

PRIZE FRONT YARD, DAYTON, O.

PRIZE BACK YARD, DAYTON, O.

get it in dollars and cents, but in satisfaction for good deeds, for he has learned that the only thing worth living for is the kindly feeling for our fellow-men."

With a similar feeling the Massachusetts Horticultural Society and the Committee on School Gardens and Children's Herbariums have undertaken a similar work and carried it to a successful result. Dayton and Boston have a bond of sympathy.

TRENTON PUBLIC SCHOOLS.

SECOND SEASON OF SCHOOL GARDEN FOR SCHOOL NO. 15.

DECEMBER 16, 1898.

MR. HENRY L. CLAPP:

DEAR SIR: In answer to your letter of the 12th: We begin our planting of seeds in our schoolrooms, the children watching the development of such plants as corn, beans, peas, etc.; then, as the spring advances, the seeds and plants are placed in the outdoor gardens by the children, they doing all the work and being very much interested in it.

We plant hardy plants for the summer months, with dahlias and chrysanthemums for fall blooming.

Our idea in starting the gardens in the first place was simply to try to cultivate a love for the beautiful in those living in the vicinity of the school, and by this means to raise the moral tone of the neighborhood.

The children, guided by the teachers, take entire care of the beds.

We find it very helpful in giving science lessons in the primary grades, besides the gain from an ethical standpoint, so that they have been worth all the time and thought given to them.

I am

Yours very truly,

ELIZABETH HUGHES.

A GERMAN SCHOOL GARDEN.

Dr. Herman T. Lukens, formerly professor in Clark University, last spring visited the George Putnam School Garden, and during the summer vacation went to Germany to observe methods of

GERMAN SCHOOL GARDEN.

education there. In his "Notes Abroad," thoughtfully sent to your chairman, is found this interesting paragraph:

"Dr. O. W. Beyer took his class up the Saale valley to Pössneck to examine one of the best organized school gardens in Germany. There, on a plot of ground prepared in 1895 at a cost of $750 and requiring an annual outlay of only $75, six hundred pupils have each his or her separate garden patch, and every day between five and six P.M. they come to weed, water, hoe, train, or otherwise attend to, and reap, what they have sown. The central path in the garden is reserved for the parents, who come there to promenade and enjoy the sight as well as to encourage their children and help them carry off the armloads of cabbages, potatoes, lettuce, onions, turnips, and flowers for home consumption.

Besides these separate beds, the garden contains a tree nursery, a frame shed for class use (as the school building is fifteen minutes distant), separate sections for industrial plants, — hemp, flax, wheat, corn, rye, etc., — for poisonous plants and noxious weeds, for alpine or mountain flora, and for swamp plants. As far as possible, plants that grow together in nature are kept together under natural conditions in the garden."

CANADA VIOLET. GEORGE PUTNAM SCHOOL GARDEN.

The high educational value of the work may be learned from the next paragraph:

"Dr. Beyer has been commissioned to revise the entire curriculum from this new standpoint of handwork, bringing everything into organic relation with it, and making it the centre out of which the other school subjects grow."

CHILDREN'S HERBARIUMS.

An extraordinary number of herbarium specimens were sent for the exhibition Nov. 25 and 26, 1898. There was not sufficient space in both halls for displaying all the plants. From one thousand three hundred and sixty-six sheets last year the number rose to two thousand two hundred and fifty-two this year, and that, too, without any special effort being made by the Committee. Such a result shows that the work has come to stay.

It has taken years of work to spread abroad the information necessary to insure a natural and permanent growth; yet at the eleventh hour new exhibitors appear every year, declaring that they have just heard of the exhibition.

If the herbariums continue to increase in number and size, which seems certain, it will be necessary in future to exhibit only the most meritorious collections, and, therefore, those who intend to exhibit will need to consider the quality of their work especially — fine specimens, artistic mounting, careful naming, neat writing, and the name of the town where the specimen was found should be added.

Vanessa Denton's one hundred and twenty-seven additions of flowering plants, considering the number of specimens and the quality of the mounting, was the most remarkable. "No ordinary collector or professor of botany would mount specimens as beautifully as those are mounted; he couldn't spend the time," a botanist was heard to say. "Well," said another, "she says she is going to be a professor of botany one of these days, and she is only twelve now. This is the second time she has exhibited, but she has never seen an exhibition of this kind here because she was in Europe, or on her way there, with her father, who has become so famous for his collections of butterflies. She is a born naturalist."

Rachel P. Snow, eleven years old, will have an interesting experience to look back upon when she is twenty. She exhibited this year for the first time and took the second prize for one hundred specimens. She began to study plants and then interested her parents to work with her. Her father bought a nice microscope, and her mother a botany. Then the mother took private lessons in botany, and all three worked together in a delightful manner, and all attended the exhibition and manifested in a quiet, studious way much discrimination on fine points, such as are found in the more difficult species of violets, pyrolas, etc.

The largest number of specimens sent by one collector was three hundred and forty-two additions of flowering plants. During the flowering seasons of 1896, '97, and '98 George E. Nichols must have had very busy, interesting, and instructive times in order to send so many complete and well-mounted specimens in addition to one hundred different specimens sent in 1895. By this time he has learned what a rare plant is.

The youngest exhibitor was Charles Withington, seven years old. Without knowing anything about our exhibitions or receiving any stimulus from them he collected and mounted one hundred and thirty-five plants on thirteen sheets. Of course the mounting and writing were hardly up to exhibition standards, but his natural interest was remarkable, and that put him in the right attitude to learn quickly from the exhibits. Besides the collections already mentioned, especially fine ones were sent by Maude Clark and Melora Warner, of the Manchester High School, Genevieve Doran and Rachel P. Snow, of Watertown, and Olive L. French and Bessie R. Parmenter, of South Sudbury.

Arthur E. French, of South Sudbury, sent some very rare plants — two sedges, four grasses, and sixteen flowering plants. Having exhibited every year since 1893, the plants unknown to him in his locality are rare indeed. And he is a rare boy.

Phillips Barry, Arthur C. Faxon, George E. Nichols, Marion C. Goward, and Lulu D. Ellis have shown the same natural love for plants, and the same persistency in hunting them out. It is very gratifying to your Committee to have seen children pursuing such work with unabated interest for four or five years, until they had thoroughly searched their own neighborhood for plants, or had reached the maximum age prescribed for exhibitors. This is the way genuine botanists are made. Apparently no other expenditure or work of this Society yields larger returns. From this seed-planting we may reasonably expect much fine fruit within a generation.

The Houghton High School, of Bolton, sent a fine school collection. Six girls belonging to the school exhibited individual collections. However, the whole work seems to have been started by one interested teacher, who did not wait until she had acquired a mass of botanical knowledge herself for fear of making a mistake in teaching or naming plants, but started right in to work and learn with the children. The spirit is superior to cut-and-dried methods; it will find a method for itself. The old notion among

teachers of infallibility, of not making a mistake, is even now preventing children from getting a love for plants as beautiful, growing things. And this Society is doing excellent work in breaking up that ancient notion, by sending children directly to plants, whether accompanied by teachers or not, and by encouraging both pupils and teachers to help themselves.

Our friends, the reporters for the principal Boston newspapers, promptly appeared when the exhibition opened, and each gave several generous and appreciative notices, which undoubtedly contributed much to the satisfactory attendance of visitors, fifty at a time being counted.

For the Committee,

HENRY L. CLAPP,

Chairman.

PRIZES AND GRATUITIES AWARDED FOR SCHOOL GARDENS AND CHILDREN'S HERBARIUMS.

SCHOOL GARDENS.

George Putnam School, Roxbury, first prize	$15 00
Curtis School, Medford, second prize	12 00
Swan School, Medford, third prize	10 00
High School, Bath, Me., gratuity	8 00

CHILDREN'S HERBARIUMS.

FLOWERING PLANTS. — For one hundred and twenty-five specimens:	
First prize, Melora Warner	5 00
For one hundred specimens:	
First prize, Maude Clark	4 00
Second, Rachel P. Snow	3 00
For seventy-five specimens:	
First prize, Bessie R. Parmenter	3 00
Second, Ella S. Waite	2 00
For fifty specimens:	
First prize, Edith Newton	2 00
For twenty-five specimens:	
First prize, Cora L. Mentzer	1 50
Second, Zipporah Sawyer	1 00
For ten specimens:	
First prize, Gonnard Landberg	75
Second, James Steele	50
Gratuities:	
George E. Nichols, for three hundred and forty-two additions	7 00
Vanessa Denton, for one hundred and twenty-seven "	5 00
Genevieve Doran, for one hundred and twenty-five "	4 00
Marion C. Goward, for one hundred and twenty-five "	3 50

Florence A. Grey, for one hundred and twenty-five specimens	3 00
Ethel Nixon, for one hundred and twenty-one specimens	2 75
Bessie A. Eckert, for seventy-five specimens	1 50
Olive L. French, for seventy-five additions	3 00
Marion Withington, for fifty specimens	1 25
Cora A. Jacobs, for thirty-three specimens	75
Arthur E. French, for sixteen additions	2 50
Charles Withington, for thirteen sheets	1 00
John D. Fallon, for ten specimens	50
Leonard A. Page, for ten "	50
FERNS. — For twenty-five specimens:	
First prize, Amelia Etzensperger	4 00
Second, Marion C. Goward	3 50
For fifteen specimens:	
First prize, Cora L. Tiley	3 00
For five specimens:	
First prize, Melora Warner	75
Gratuities:	
Clara M. Hathaway, for eighteen additions	3 50
Arthur E. French, for four additions of grasses	1 00
Arthur E. French, for two additions of sedges	1 00

SCHOOL HERBARIUMS.

Houghton High School, Bolton, first prize for four classes — flowering plants two hundred and thirty-eight, ferns nine, leaf sprays nineteen, grasses five		4 00
Total for Herbariums and Gardens		$124 75
The amount of money appropriated by the Society for the use of this Committee was		$250 00
Awarded for School Gardens	$45 00	
Awarded for Herbariums	79 75	
Kilburn & Cross (cut)	5 00	
Printing	25 75	
Advertising	18 20	
Expressage, postage, stamping, etc.	9 80	
		183 50
Balance unexpended		$66 50

HENRY L. CLAPP, Roxbury,
Mrs. H. L. T. WOLCOTT, Dedham,
GEORGE E. DAVENPORT, Medford,
Miss KATHARINE W. HUSTON, Roxbury,
Mrs. P. D. RICHARDS, West Medford,
WILLIAM P. RICH, Chelsea,
W. E. C. RICH, *Secretary*,
99 Moreland st., Roxbury, Mass.,

Committee on School Gardens and Children's Herbariums.

REPORT

OF THE

COMMITTEE OF ARRANGEMENTS

FOR THE YEAR 1898.

By JOSEPH H. WOODFORD, CHAIRMAN.

The year just about closing has been one of unusual importance to our Society, and the exhibitions, numbering twenty-three in all, have been attended by great multitudes of people.

The halls have been arranged in such a manner as best to accommodate the increased number of exhibitors. At some of our shows (notably the chrysanthemum exhibition) the lower hall was very much overcrowded with magnificent flowers, yet when the exhibition was opened to the public at twelve o'clock, noon, it presented a grand appearance; for here was displayed the finest collection of chrysanthemum flowers ever exhibited in this country.

The hall was arranged with the greatest extent of table room possible, and in the best possible manner consistent with the limited space at the disposal of your Committee.

It is a pity that we have not a fine hall on the ground floor, of sufficient capacity to contain, without crowding, all the exhibits, and, in addition, sufficient space for the comfort of exhibitors and the public.

No one feels more the want of more expanded quarters than does your Committee, for it is at times very embarrassing to find room for exhibits in such limited quarters as are now at their disposal.

We would again call attention to our Report for the year 1895, in which we allude to the poor accommodations we then had for our exhibitions, and we are sorry to say they still exist, and at present we see no immediate prospect of relief.

We are under renewed obligations to the press for the copious reports of our exhibitions which they have so faithfully published; and we are also glad to report enthusiastic competition by new members of our Society, thereby filling up any vacancies occasioned by the dropping out of some of the older exhibitors.

The amount of money placed to the credit of your Committee for extraordinary expenses has been expended judiciously, and for the best interests of our Society.

The receipts for admission to the two shows at which fees were exacted will appear at the end of this report, and we fully believe they would have been very much greater had we had at our disposal better accommodations for the comfort of our patrons.

From the Treasurer's books we take the following:

Receipts at Spring Exhibition	$294 00
Receipts at Chrysanthemum Exhibition . . .	568 50
	$862 50

all of which is in the Treasury of the Society.

Respectfully submitted,
For the Committee,
Jos. H. Woodford,
Chairman.

REPORT

TO THE

STATE BOARD OF AGRICULTURE

FOR THE YEAR 1898.

The Massachusetts Horticultural Society began its year of 1898 with a series of lectures which continued through March. A full report of them is made in Part I. of the TRANSACTIONS of the Society for this year.

January 8. "The Business Side of Fruit Culture," by Mr. J. H. Hale, South Glastonbury, Conn.

January 15. "Horticulture in Holland: Decoration in Public Parks, Bulb Growing, Nursery Stock at Boskoop." (With stereopticon illustrations.) By Mr. John K. M. L. Farquhar, Boston, Mass.

January 22. "Originating New Vegetables," by Hon. Aaron Low, Hingham, Mass.

January 29. "Nuts and Nut Culture," by Mr. Frank M. Bartram, Parry, N.J.

February 12. "Some New Notions about Some Old Insects," by Prof. M. V. Slingerland, Cornell University, Ithaca, N.Y.

February 19. "Trees in Streets and Elsewhere," by Mr. W. R. Smith, Superintendent Botanic Garden, Washington, D.C.

February 26. "The National Flower Movement," by Mr. Frederick Leroy Sargent, President Columbine Association, Cambridge, Mass.

March 12. "The Relation of Our Public Schools to Rural and Urban Life, and the Value of Nature Studies in Our System of Public Instruction," by Mr. George T. Powell, Ghent, N.Y.

March 19. "The Resistance of Plants to Parasitic Fungi," by Prof. E. A. Burt, Middlebury College, Middlebury, Vt.

March 26. "Native Ferns of New England." (Illustrated by numerous lantern slides.) By Mr. Henry Lincoln Clapp, George Putnam School, Boston, Mass.

April 21. "Wild Flowers of the Canadian Rockies," by Mr. Cornelius Van Brunt.

The Spring Exhibition was opened March 22, and continued through the 25th.

The Rhododendron Show was held June 7 and 8.

The Rose and Strawberry Exhibition was held June 23 and 24.

The Annual Exhibition of Plants and Flowers was held August 31 and September 1.

The Annual Exhibition of Fruits and Vegetables was held September 29 and 30.

The Chrysanthemum Exhibition was held for four days, beginning November 8.

There were also held prize exhibitions on Saturdays from 12 M. to 3 P.M., April 2, May 7, May 21, June 11, September 10, September 17, November 5, and every Saturday from July 2 to August 20, inclusive.

The Society offered $8,100 in prizes.

All of the exhibits were fully above the high standard of excellence maintained by the Society and showed a very marked improvement in the gardeners' skill.

Respectfully submitted,

N. I. Bowditch,

Inspector.

REPORT

OF THE

COMMITTEE ON THE LIBRARY

FOR THE YEAR 1898.

The Committee on the Library makes its customary report that its appropriations have been expended in the usual way and the List of Accessions to the Library for the year will show that the increase of the Library by gift and purchase has been very nearly the same as for several years past.

It is well known that the Stickney Fund passes out of our possession at the end of this year, but it becomes us rather to rejoice that we have had it so long than to repine that it is not ours permanently; for, mainly owing to the income we have received from it in these thirty years, this Library has grown from the condition of a humble collection of commonplace books to a place in the very front rank of special libraries. In default of this fund the Committee will ask for an appropriation sufficient to keep the Library moving in the path of progress and improvement.

The crowded condition of our bookcases may cause some to question the wisdom of continuing our purchases before some additional storage room can be provided, but there are many works which must be had soon, if at all. Learned societies and large public libraries are fast gathering in the very few remaining copies of some of these, and the price of those which are left must, of course, advance rapidly. Some of our costliest books could not now be purchased for three times what we gave for them, and duplicates of many of them cannot now be had at any price.

Moreover, as the income of the Stickney Fund was restricted by the donor to the purchase of books, we have not been able to do as much in the way of binding as the needs of the Library demanded.

If these matters be fully understood we have no doubt that the Society will act in that liberal manner which has distinguished it whenever the Library has made requests in the past.

For the Committee,

W. E. Endicott,

Chairman.

REPORT

OF THE

SECRETARY AND LIBRARIAN.

The publication of Part II. of the TRANSACTIONS for 1897 was much delayed by the failure of the Chairman of one of the awarding committees to make his report, and after delay caused by unfulfilled promises to bring it in, the Committee on Publication were obliged to order that this part of the Transactions be printed without the report in question. Part I. for 1898 was delayed, as last year, by the failure of one of the lecturers to return his lecture, which he had taken home for revision. This failure was caused by an accident which totally unfitted him for any work, and at the last accounts he feared that he had promised what he could not perform. The Committee have therefore directed that in the absence of this lecture the abstract prepared for the "Transcript" be printed in its place. But for these unfortunate occurrences the Transactions above mentioned would have been printed some months earlier than they will now be. Part I. for 1898 is, however, now in type, and will speedily be published. There still remain the third parts for 1896 and 1897, consisting of the List of Library Accessions for those years, but the former is now nearly ready for the printer. The great labor of preparing these lists has prevented an earlier performance of it. The Schedule of Prizes for 1898 was ready before the end of the preceding year, and that for 1899 is now nearly ready to be printed. At the request of the Committee on Establishing Prizes a statement of all the changes made in the Schedule for 1898 to adapt it to the next year has been prepared and printed.

The most notable event in the history of the Library during the present year is the expiration of the interest of the Society in the Stickney Fund. During the thirty years that the Society has enjoyed the benefit of this fund, the income, amounting in all to

$21,000, has been most carefully devoted to the purpose for which it was designed by the donor, and the result is such a collection of books as forms a noble monument to his memory. The names of all these books have been published from year to year, and the most important have been specially mentioned, and the members of this Society should not now need to have the names of even the most noteworthy recalled. If there are any who are not aware of the importance and value of these books — which will increase from year to year — we trust that they will visit this room and learn to appreciate it. But it must not be assumed that Mr. Stickney's gift has left no more to be acquired of books published in the past; and research in botany, horticulture, and kindred sciences was never more active than now, and we may expect that in the future many books will be published which should on no account fail to find a place in our Library. Indeed, among those already published, several classes of books that we have not already acquired might be named of which this would be true, and we cannot doubt that the Society will make an appropriation sufficient for the purchase of such books. In the present crowded state of our bookcases it may be expedient not to purchase so many books as we should if we had ample room, but to devote more time and money to the binding of those which are in need, such as the publications of the United States Department of Agriculture and the Experiment Station Bulletins, of both of which our collection is probably among the most complete in existence. And in the good time, which no one who has faith in the Society doubts is coming, when all its departments shall be provided with ample room, not only for that day, but for further growth, we trust that the Society will meet its claims with an appropriation sufficient to keep up the well-deserved reputation of the Library.

The problem how to increase the usefulness of the Library has been kept constantly in view. Perhaps this end may be better attained by indirect than by direct methods. It will be of little avail to entreat or urge men to come and use books on subjects in which they feel no interest, but the Society is constantly engaged in the work of educating the community in a taste for horticulture, and we cannot doubt that with the growth of this taste the use of the Library will increase. If any one had been asked four years ago what department of the Library was most likely to spring into prominence and usefulness, perhaps the last

that he would have thought of would have been that of Mycology and other branches of Cryptogamic Botany, and yet within that time we have seen such a growth of interest in that very department. And to draw an illustration from that field — I should not be surprised if hidden agencies were now at work which may lead to equal interest in some other department of the Library, or even in the whole subject of botany and horticulture, as the obscure growth of mycelium suddenly makes itself visible in wholesome and delicious mushrooms. It may be doubted whether any library accomplishes all the good that it may be imagined capable of effecting, but we cannot think that the magnificent works purchased by Mr. Stickney's gift, the thought given to their selection, the thousands of books received from other sources, the care and pains taken to perfect copies and sets, and to catalogue and index them, so that they shall rise from the position of a mere collection of books to the dignity of a library, are destined to come to naught, or to fail of ultimate appreciation.

The Card Catalogues of Plates, of Books, and of Subjects treated in the Reports of Experiment Stations throughout the country have been kept constantly in mind, and as much time as could be given, consistently with duty to other departments, has been bestowed upon them. The last mentioned, which is prepared at the Office of Experiment Stations, in the United States Department of Agriculture, although much less extensive than either of the other two, now contains 17,000 cards.

Among the more important books added to the Library during the year may be mentioned Beccari's "Malesia," in three volumes; Lowe's "Yew Trees of Great Britain and Ireland;" Step's "Favourite Flowers of Garden and Greenhouse," in four volumes; Hogg and Johnson's "Wild Flowers of Great Britain," in eleven volumes; a supplementary volume to the last edition of Sowerby's English Botany; Watt's "Dictionary of the Economic Products of India," six volumes in ten; Duthie's "Field and Garden Crops of India," in three parts; a large folio book of Chinese drawings illustrating the Growth and Progress of the Tea Plant; Field's "Ferns of New Zealand;" and the "Pomologie de la France," a work published by the coöperation of French horticultural and agricultural societies, six volumes in three.

An unusually large number of books on Entomology have been purchased, including Buckton's "Monograph of British Aphides,"

in four volumes; Cameron's "Monograph of the British Phytophagous Hymenoptera," in four volumes; Humphreys and Westwood's "British Moths," in two volumes; the "British Butterflies" of the same authors; Holland's "Butterfly Book;" and Douglas and Scott's British "Hemiptera Heteroptera," all illustrated with many plates, which, except in the last mentioned, are colored. This, however, is so important a work that the Assistant Entomologist of the Gypsy Moth Commission made two journeys to Amherst to consult it, but now he can find it without going so far. The enthusiasts in the study of Fungi have been remembered by the purchase of Richon and Roze's "Champignons Comestibles et Vénéneux de la France," and Rabenhorst's "Kryptogamen Flora," the latter not yet completed, but already numbering five volumes in eleven parts. We have long possessed the Second Series of "The Phytologist," and now have been so fortunate as to secure the First Series — a much more difficult achievement than to obtain a second series to add to a first.

ROBERT MANNING,
Secretary and Librarian.

DECEMBER 17, 1898.

TREASURER'S REPORT

FOR THE YEAR 1898.

MASSACHUSETTS HORTICULTURAL SOCIETY, *in account current with* CHARLES E. RICHARDSON, *December 31, 1898.*

DR.

To amount paid on account of Library in 1898:		
For books, periodicals, and binding . . .	$400 00	
From income of J. Stickney Fund for books .	730 74	
		$1,130 74
To amounts paid Interest on Funds for Prizes, credited opposite		1,892 72
" " " " " Notes and Bonds purchased . .		271 45
" " " on Prizes awarded in 1897, paid in 1898, as follows:		
" amounts paid for Plants	$1,938 50	
" " " " Fowers	2,526 00	
" " " " Fruits	1,592 00	
" " " " Vegetables	1,151 00	
" " " " Gardens and Greenhouses .	500 00	
" " " Hunnewell Prizes for Rhododendrons	105 00	
		7,812 50
To amounts paid Committee on School Gardens and Children's Herbariums		183 50
" " " Lake Shore & Michigan Southern R.R. Bonds	$10,415 25	
" " " City of Newton Bonds . . .	24,228 75	
" " " Atchison, Topeka & Santa Fé R.R. Bonds	44,693 25	
" " " Chicago, Burlington & Quincy R.R. Bonds	50,012 50	
		129,349 75
To amounts paid on Notes Receivable		40,000 00
" " " " Loan from National Webster Bank . .		18,000 00
" " " Salaries of Secretary, two Assistants and Treasurer		4,300 00
" " " Salaries of Committees		1,248 00
" " " City Tax		3,141 69
Amount carried forward		$207,325 35

Amount brought forward	$207,325 35
To amount paid Legal Services	4,097 41
" " " Incidentals	854 72
" " " Services on Transactions	78 00
" " " Stationery, Printing, and Postage	1,452 02
" " " Labor	2,392 95
" " " Committee of Arrangements	400 00
" " " Insurance	1,413 37
" " " Repairs	634 05
" " " Furniture and Exhibition Ware	24 15
" " " Heating	775 09
" " " Lighting	882 40
" " " Water Rates	276 20
" " " Lectures and Publication	269 55
Total payments	$220,875 26
Cash balance December 31, 1898	14,105 60
	$234,980 86

CR.

By Balance of account rendered December 31, 1897			$6,664 89
Received from Building in 1898, viz.:			
Rent of Stores	$11,266 66		
" " Halls	2,500 00		
		$13,766 66	
Received Income from Mount Auburn		3,156 21	
" State Bounty		600 00	
" Admissions and Assessments		1,010 00	
" Annual Exhibitions:			
Gross Receipts	$862 50		
Less Expenses	539 78		
		322 72	
" Interest on Bonds	$5,105 00		
" " " Town Notes	953 87		
" " " Legacy from F. B. Hayes,	1,722 12		
" " " Bank Balance	391 84		
		8,172 83	
" Copies of History		5 50	
" Notes Receivable		40,000 00	
" Sale of Transactions		1 00	
" H. H. Hunnewell, Prize money for 1897		55 00	
" A. P. Loring, Executor		15,000 00	
" Francis Brown Hayes Fund		10,000 00	
Amounts carried forward		$92,089 92	$6,664 89

Amounts brought forward			$92,089 92	$6,664 89
Received Bequest of Francis Brown Hayes .			133,333 33	
" Henry A. Gane Memorial Fund . .			1,000 00	
" Interest credited following Funds, charged opposite:				
Samuel Appleton Fund .	$50 00			
John A. Lowell " .	50 00			
Josiah Bradlee " .	50 00			
Benjamin V. French Fund .	25 00			
W. J. Walker " .	117 72			
Levi Whitcomb " .	25 00			
Benjamin B. Davis " .	25 00			
Marshall P. Wilder " .	50 00			
John Lewis Russell " .	50 00			
Theodore Lyman " .	550 00			
H. H. Hunnewell " .	200 00			
Josiah Stickney Fund, as agreed	700 00			
			1,892 72	
				228,315 97
				$234,980 86

CHARLES E. RICHARDSON,
Treasurer.

Approved:

H. H. HUNNEWELL,
A. HEMENWAY,
FRANCIS H. APPLETON,
} *Finance Committee.*

ASSETS AND LIABILITIES OF THE MASSACHUSETTS HORTICULTURAL SOCIETY.

DECEMBER 31, 1898.

ASSETS.

Real Estate	$250,000 00	
Stereotype Plates and Copies of History	251 50	
Lake Shore & Michigan So. R.R. Bonds	10,415 25	
City of Newton Bonds	24,228 75	
Chicago, Burlington & Quincy R.R. Bonds	1,000 00	
Atchison, Topeka & Santa Fé R.R. Bonds	44,693 25	
Chicago, Burlington & Quincy R.R. Bonds	50,012 50	
Sinking Fund	23,872 50	
Kansas City, Clinton & Springfield R.R. Bonds	1,980 00	
Furniture and Exhibition Ware	7,674 90	
Library	38,111 47	
City of Boston	352 62	
Charles I. Quirk	75 00	
A. P. Loring, Executor	7,500 00	
H. E. Woodward	8,350 81	
George A. Sutherland	97 50	
Cash on hand and in Bank	14,105 60	
		$482,721 65

LIABILITIES.

Mortgage		$1,000 00	
Josiah Stickney Fund payable to Harvard College, Feb. 1, 1899		12,000 00	
Unexpended balance of Stickney Fund for Books,		1 00	
Prize Funds invested in Building:			
Samuel Appleton Fund,	$1,000 00		
John A. Lowell "	1,000 00		
Josiah Bradlee "	1,000 00		
Benjamin V. French "	500 00		
William J. Walker "	2,354 43		
Levi Whitcomb "	500 00		
Benjamin B. Davis "	500 00		
Theodore Lyman "	11,000 00		
H. H. Hunnewell "	3,000 00		
Francis Brown Hayes "	10,000 00		
Henry A. Gane Memorial "	1,000 00		
		$31,854 43	
Amounts carried forward,		$31,854 43	$13,001 00

Amounts brought forward,		$31,854 43	$13,001 00	
Invested in Bonds:				
Marshall P. Wilder Fund,	$1,000 00			
John Lewis Russell "	1,000 00			
H. H. Hunnewell "	1,000 00			
		3,000 00		
			34,854 43	
Prizes for 1898 payable in 1899			8,100 00	
				55,955 43
Surplus				426,766 22
				$482,721 65

CHAS. E. RICHARDSON,
Treasurer.

MEMBERSHIP ACCOUNT OF THE MASSACHUSETTS HORTICULTURAL SOCIETY, DECEMBER 31, 1898.

Life Members per last report	549		
Added in 1898	11		
Commuted from Annual	7		
		567	
Deceased	32		
			535
Annual Members per last report	212		
Added in 1898	18		
		230	
Commuted to Life	7		
Deceased	5		
Resigned	2		
Dropped for non-payment for two years	13		
		27	
			203
Present Membership			738

INCOME FROM MEMBERS.

11 new Life Members @ $30	$330 00
18 new Annual Members @ $10	180 00
7 Commuted to Life @ $20	140 00
Annual Assessments	30[illegible] 00
	$1,010 0[illegible]

CHAS. E. RICHARDSON,
Treasurer.

Dr. *Massachusetts Horticultural Society in account with the Proprietors of Mount Auburn Cemetery.* **Cr.**

For Sales and Improvements within the Cemetery for the year ending December 31, 1898.

To cost of filling up and improving land at Mount Auburn for the year ending Dec. 31, 1898, the Massachusetts Horticultural Society being charged with their proportion of the same:			By sales in January	$500 00
Birch to Eagle and Cherry Avenues	$64 68		" " February	10 00
Vinca Path and Maple Avenue	55 31		" " March	651 40
Yew and Fountain Avenues	66 75		" " April	2,336 00
Glen Avenue	237 19		" " May	3,543 35
	$423 93		" " June	1,380 00
One-fourth of $423.93 is	$105 98		" " July	1,440 00
Balance due Mass. Horticultural Society,	3,156 21		" " August	225 00
			" " September	1,096 00
			" " October	915 00
			" " November	1,190 00
			" " December	130 00
				$13,416 75
			Net amount received from Receiving Tomb	1,082 00
				$14,498 75
			Less graves repurchased	50 00
				$14,448 75
			Deduct for Annual Expenses	1,400 00
				$13,048 75
		$3,262 19	Mass. Horticultural Society ¼ part of $13,048.75	$3,262 19

E. & O. E.

DECEMBER 31, 1898.

H. B. MACKINTOSH, *Treasurer.*

MASSACHUSETTS HORTICULTURAL SOCIETY

To the PROPRIETORS OF MOUNT AUBURN CEMETERY. *Dr.*

For one-fourth part of the following expenditures for grading new lands for sale during the year 1898:

Birch to Eagle and Cherry Avenues.		
28¾ days, men		$64 68
Vinca Path and Maple Avenue.		
20 days, men	$45 00	
2¾ days, man and horse	10 31	
		55 31
Yew and Fountain Avenues.		
16¾ days, men	$37 69	
7¾ days, man and horse	29 06	66 75
Glen Avenue.		
63¼ days, man and horse		237 19
		$423 93
One-fourth of $423.93 is		$105 98

JAMES C. SCORGIE,

Supt. of the Cemetery of Mount Auburn.

MOUNT AUBURN, Dec. 31, 1898.

I certify the foregoing to be a true copy of improvements for the year 1898, rendered by the Superintendent.

H. B. MACKINTOSH,

Treasurer.

Massachusetts Horticultural Society.

OFFICERS AND STANDING COMMITTEES FOR 1899.

President.

FRANCIS H. APPLETON, of Peabody.

Vice-Presidents.

CHARLES H. B. BRECK, of Brighton.
BENJAMIN P. WARE, of Clifton.
WALTER HUNNEWELL, of Wellesley.
SAMUEL HARTWELL, of Lincoln.

Treasurer and Superintendent of the Building.

CHARLES E. RICHARDSON, of Cambridge.

Secretary and Librarian.

ROBERT MANNING, of Salem.[1]

Professor of Botany and Vegetable Physiology.

BENJAMIN M. WATSON, of Jamaica Plain.

Professor of Entomology.

SAMUEL H. SCUDDER, of Cambridge.

Delegate to the State Board of Agriculture.

E. W. WOOD, of West Newton.

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[1] Communications to the Secretary, on the business of the Society, should be addressed to him at Horticultural Hall, Boston.

STANDING COMMITTEES.

Executive.

THE PRESIDENT, FRANCIS H. APPLETON, CHAIRMAN.

THE CHAIRMAN OF THE FINANCE COMMITTEE, H. H. HUNNEWELL, *Ex officio.*

WILLIAM C. STRONG.
WILLIAM H. SPOONER.
NATHANIEL T. KIDDER.
BENJAMIN C. CLARK.
WALTER HUNNEWELL.
CHARLES W. PARKER.
CHARLES F. CURTIS.

Finance.

H. HOLLIS HUNNEWELL, OF BOSTON, CHAIRMAN.

FRANCIS H. APPLETON.
AUGUSTUS HEMENWAY.

Lectures and Publication.

AARON LOW, OF HINGHAM, CHAIRMAN.

JAMES H. BOWDITCH.
E. W. WOOD.

Library.

WILLIAM E. ENDICOTT, OF CANTON, CHAIRMAN.

GEORGE W. HUMPHREY.
WALTER S. PARKER.
GEORGE E. DAVENPORT.
CHARLES W. SWAN.

Plants.

WILLIAM WALLACE LUNT, OF HINGHAM, CHAIRMAN.

JAMES WHEELER.
WILLIAM J. MARTIN.
ARTHUR H. FEWKES.
ROBERT CAMERON.

Flowers.

J. WOODWARD MANNING, OF READING, CHAIRMAN.

MICHAEL H. NORTON.
KENNETH FINLAYSON.
FREDERICK S. DAVIS.
JAMES COMLEY.

Fruits.

E. W. WOOD, OF WEST NEWTON, CHAIRMAN.

CHARLES F. CURTIS.
O. B. HADWEN.
WARREN FENNO.
SAMUEL HARTWELL.
J. WILLARD HILL.
SUMNER COOLIDGE.

Vegetables.

WARREN H. HEUSTIS, OF BELMONT, CHAIRMAN.

CEPHAS H. BRACKETT.
VARNUM FROST.
WALTER RUSSELL.
AARON LOW.
GEORGE D. MOORE.
JOSHUA C. STONE.

Forestry and Roadside Improvement.

HARVEY N. SHEPARD, CHAIRMAN.

NATHANIEL S. SHALER.
J. D. W. FRENCH.
J. WOODWARD MANNING.
JAMES STURGIS PRAY.

Gardens.

PATRICK NORTON, of Dorchester, Chairman.

CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND ARRANGEMENTS, *Ex officiis.*

HENRY W. WILSON. JACKSON T. DAWSON.

For Establishing Prizes.

WILLIAM J. STEWART, of Winchester, Chairman.

CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND GARDENS, *Ex officiis.*

WILLIAM J. MARTIN.

Committee of Arrangements.

JOSEPH H. WOODFORD, of Boston, Chairman.

CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND GARDENS, *Ex officiis.*

ROBERT FARQUHAR.

MEMBERS FOR LIFE.

Members of the Society and all other persons who may know of deaths, changes in residence, or other circumstances showing that the following list is incorrect in any particular, will confer a favor by promptly communicating to the Secretary any needed corrections.

Information, or any clew to it, is especially desired in regard to members whose names are marked thus †.

Adams, Henry Saxton, Dorchester.
Adams, Luther, Newton.
Alger, Rev. R. F., Becket.
Allen, Hon. Charles H., Lowell.
Allen, Thomas, Boston.
Ames, George, Boston.
Ames, Oakes, 2d, North Easton.
Ames, Preston Adams, Boston.
Amory, Frederick, Boston.
Andrews, Charles L., Milton.
Andrews, Frank W., Washington, D.C.
Andros, Milton, San Francisco, Cal.
Appleton, Francis H., Peabody.
Appleton, William S., Boston.
Ash, John, Pomfret Centre, Conn.
Asmus, Ernst G., West Hoboken, N.J.
Atkins, Edwin F., Belmont.

Bailey, Jason S., West Roxbury.
Bancroft, John C., Boston.
Banfield, Francis L., M.D., Worcester.
Barber, J. Wesley, Newton.
Barnard, James M., Boston.
Barnard, Robert M., Everett.
Barnes, Walter S., Somerville.
† Barney, Levi C., Boston.
Barrett, Edwin S., Concord.
Barry, John Marshall, Boston.
Barry, William C., Rochester, N.Y.
Bartlett, Edmund, Newburyport.
Beal, Leander, Boston.
Becker, Frederick C., Cambridge.
Beckford, Daniel R., Jr., Jamaica Plain.
Beebe, E. Pierson, Boston.
Beebe, Franklin H., Boston.
Beebe, J. Arthur, Boston.
Berry, James, Brookline.
Blake, Edward D., Boston.
Blake, Francis, Weston.
Blake, Frederick A., Rochdale.
Blakemore, John E., Roslindale.
Blanchard, John W., Dorchester.
Blinn, Richard D., Chicago, Ill.
Bliss, William, Boston.
Boardman, Samuel M., Hyde Park.
Bôcher, Prof. Ferdinand, Cambridge.
Bockus, Charles E., Dorchester.
Bosler, Frank C., Carlisle, Penn.
Bowditch, Azell C., Somerville.
Bowditch, Charles P., Jamaica Plain.
Bowditch, Ernest W., Milton.
Bowditch, James H., Brookline.
Bowditch, Nathaniel I., Framingham.
Bowditch, William E., Roxbury.
Bowker, William H., Boston.
Brackett, Cephas H., Brighton.
Brackett, Charles N., Watertown.
Bresee, Albert, Hubbardton, Vt.

Brewer, Francis W., Hingham.
Briggs, William S., Lincoln.
Brigham, William T., Honolulu, Hawaii.
Brooks, J. Henry, Milton.
Brown, Alfred S., Jamaica Plain.
Brown, Charles E., Yarmouth, N.S.
Brown, Edward J., Weston.
Brown, George Barnard, Brookline.
Brown, John T., Newburyport.
Bullard, John R , Dedham.
Burlen, William H., Boston.
Burnett, Harry, Southborough.
Burr, Matthew H., Hingham.
Buswell, Frank E., Brooklyn, N.Y.
Butler, Aaron, Wakefield.
Butler, Edward K., Jamaica Plain.

Cabot, Edward C., Brookline.
†Cadness, John, Flushing, N.Y.
Cains, William, South Boston.
Calder, Augustus P., Boston.
Cameron, Robert, Cambridge.
Campbell, Francis, Cambridge.
Capen, John, Boston.
Carlton, Samuel A., Boston.
Carr, Hon. John, Roxbury.
Carter, Charles N., Boston.
Carter, Miss Maria E., Woburn.
Cartwright, George, Dedham.
Chadbourne, Marshall W., Mount Auburn.
Chaffin, John C., Newton.
Chamberlain, Chauncy W., Boston.
Chase, Andrew J., Lynn.
Chase, Daniel E., Somerville.
Chase, George B., Dedham.
Chase, William M., Dorchester.
Cheney, Amos P., Natick.
Cheney, Mrs. Elizabeth S., Wellesley.
Childs, Nathaniel R., Boston.
Choate, Charles F., Southborough.
Christie, William, Newton.
Claflin, Hon. William, Newtonville.
Clapp, Edward B., Dorchester.
Clapp, James H., Dorchester.
Clapp, William C., Dorchester.
Clark, Benjamin C., Boston.
Clark, B. Preston, Cohasset.
Clark, Miss Eleanor J., Pomfret Centre, Conn.
Clark, J. Warren, Rockville.
Clarke, Miss Cora H., Boston.
Cleary, Lawrence, West Roxbury.
Clough, Micajah Pratt, Lynn.
Cobb, Albert A., Brookline.
Cobb, John C., Milton.
Coburn, Isaac E., Everett.
Codman, James M., Brookline.
Codman, Ogden, South Lincoln.
Collamore, Miss Helen, Boston.
Converse, Elisha S., Malden.
Converse, Parker L., Woburn.
Coolidge, Joshua, Mount Auburn.
Cottle, Henry C., Boston.
Cowing, Walter H., West Roxbury.
Cox, Thomas A , Dorchester.
Coy, Samuel I., Boston.
Crawford, Dr. Sarah M., Roxbury.
Crocker, Miss S. H., Boston.
Crosby, George E., West Medford.
†Crowell, Randall H., Chelsea.
Curtis, Charles F., Jamaica Plain.
Cushing, Livingston, Weston.
Cushing, Robert M., Boston.

†Daggett, Henry C., Boston.
Damon, Frederick W., Arlington.
Dana, Charles B., Wellesley.
Davenport, Albert M., Watertown.
Davenport, Edward, Dorchester.
Davenport, George E., Medford.
Davis, John, Lowell.
Dawson, Jackson T., Jamaica Plain.
Day, William F., Roxbury.
Dee, Thomas W., Mount Auburn.
Denny, Clarence H., Boston.
Denton, Eben, Dorchester.
Dewson, Francis A., Newtonville.
Dexter, F. Gordon, Boston.
Dickerman, George H., Somerville.
Dike, Charles C., Stoneham.
Doliber, Thomas, Brookline.

Donald, William, West Roxbury.
Dorr, George, Dorchester.
Dove, George W. W., Andover.
Dowse, William B. H., West Newton.
Draper, Hon. Eben S., Hopedale.
Dreer, William F., Philadelphia, Pa.
Dumaresq, Herbert, Chestnut Hill.
Dunlap, James H., Nashua, N.H.
Durant, William, Boston.
Durfee, George B., Fall River.
Dutcher, Frank J., Hopedale.

Eaton, Horace, Cambridge.
Edgar, William W., Waverly.
Eldredge, H. Fisher, Boston.
†Eldridge, E. H., Roxbury.
Ellicott, Joseph P., Boston.
Elliot, Mrs. John W., Boston.
Elliott, William H., Brighton.
Endicott, William, Jr., Boston.
Endicott, William, 3d, Boston.
Endicott, William E., Canton.
Estabrook, Arthur F., Boston.
Everett, William, Dorchester.
Ewell, Warren, Dorchester.

Fairchild, Charles, Boston.
Falconer, William, Pittsburgh, Pa.
Farlow, Lewis H., Newton.
Farnsworth, Mrs. William, Dedham.
Farquhar, James F. M., Roslindale.
Farquhar, John K. M. L., Roxbury.
Farquhar, Robert, Boston.
Faxon, John, Quincy.
Fewkes, Arthur H., Newton Highlands.
Finlayson, Kenneth, Brookline.
Fisher, James, Roxbury.
Flagg, Augustus, Boston.
Fletcher, George V., Belmont.
Fletcher, J. Henry, Belmont.
Fletcher, John W., Chelsea.
Flint, David B., Boston.
Foster, Francis C., Cambridge.
Fottler, John, Jr., Dorchester.
Fowle, George W., Jamaica Plain.
Fowle, William B., Auburndale.
French, J. D. Williams, Boston.
French, Jonathan, Boston.
French, S. Waldo, Jamaica Plain.
French, W. Clifford, Cambridge.
Frohock, Roscoe R., Malden.

Galloupe, Charles W., Swampscott.
Galvin, John, Boston.
Gardner, George A., Boston.
Gardner, George P., Boston.
†Gardner, Henry N., Mount Auburn.
Gibbs, Wolcott, M.D., Newport, R.I.
Gill, George B., Medford.
Gillard, William, Harrison Square, Dorchester.
Gilmore, E. W., North Easton.
Gilson, F. Howard, Reading.
Glover, Joseph B., Boston.
Goddard, A. Warren, Brookline.
Goddard, Joseph, Sharon.
Goddard, Mrs. Mary T., Newton.
Goodell, L. W., Dwight.
Gorham, James L., Jamaica Plain.
†Gould, Samuel, Boston.
Gowing, Mrs. Clara E., Kendall Green.
Gray, James, Wellesley.
Gregory, Hon. James J. H., Marblehead.
Grey, Benjamin, Malden.
Guild, J. Anson, Brookline.

Hadwen, Obadiah B., Worcester.
Hale, James O., Byfield.
Hall, Edwin A., Cambridgeport.
Hall, George A., Chelsea.
Hall, George R., M.D., Warren, R.I.
Hall, Osborn B., Malden.
Hall, William F., Brookline.
Halliday, William H., South Boston.
Hammond, Gardiner G., New London, Conn.
Hammond, George W., Boston.
Hanson, P. G., Woburn.
†Harding, George W., Arlington.
Harding, Louis B., Stamford, Conn.
Hardy, F. D., Cambridgeport.

Harlow, James F., Quincy.
Harris, Charles, Cambridge.
Harris, Thaddeus William, A.M., Keene, N.H.
Harwood, George Fred, Newton.
Haskell, John C., Lynn.
Hastings, Levi W., Brookline.
Hatch, Mrs. C. S., North Cambridge.
Hatch, Edward, Boston.
Hathaway, Seth W., Marblehead.
Hawken, Mrs. Thomas, Rockland, Me.
†Hazeltine, Hazen, Boston.
Hemenway, Augustus, Canton.
Henshaw, Joseph P. B., Boston.
Hewett, Miss Mary C., Canton.
Hews, Albert H., North Cambridge.
Hilbourn, A. J., Boston.
Hill, John, Stoneham.
Hittinger, Jacob, Mount Auburn.
Hoar, Samuel, Concord.
Hodgkins, John E., Portsmouth, N.H.
Hoitt, Hon. Charles W., Nashua, N.H.
Hollingsworth, Amor L., Milton.
Hollis, George W., Grantville.
Holmes, Edward J., Boston.
Holt, Mrs. Stephen A., Winchester.
Horner, Mrs. Charlotte N. S., Georgetown.
Horsford, Miss Kate, Cambridge.
Hovey, Charles H., South Pasadena, Cal.
Hovey, Stillman S., Woburn.
Howard, Joseph W., Somerville.
Hubbard, Charles Wells, Weston.
Hubbard, James C., Everett.
Humphrey, George W., Dedham.
Hunnewell, Arthur, Wellesley.
Hunnewell, Henry Sargent, Wellesley.
Hunnewell, H. Hollis, Wellesley.
Hunnewell, Walter, Wellesley.
Hunt, Dudley F., Reading.
Hunt, Francis W., Melrose.
†Hunt, Franklin, Boston.
Hunt, William H., Concord.

Jack, John George, Jamaica Plain.
Jackson, Charles L., Cambridge.
Jackson, Robert T., Dorchester.
Janvrin, William S., Revere.
Jenks, Charles W., Bedford.
Johnson, J. Frank, Boston.
Jones, Jerome, Brookline.
Jones, Dr. Mary E., Boston.
Jose, Edwin H., Cambridgeport.

Kakas, Edward, West Medford.
Kellen, William V., Marion.
Kelly, George B., Jamaica Plain.
Kendall, D. S., Woodstock, Ont.
Kendall, Edward, Cambridgeport.
†Kendall, Joseph R., San Francisco, Cal.
Kendall, Dr. Walter G., Atlantic.
Kendrick, Mrs. H. P., Allston.
Kennedy, George G., M.D., Roxbury.
Kent, John, Brookline.
†Keyes, E. W., Denver, Col.
Keyes, John M., Concord.
Kidder, Charles A., Southborough.
Kidder, Nathaniel T., Milton.
†Kimball, A. P., Boston.
Kingman, Abner A., Brookline.
Kingman, C. D., Middleborough.
Knapp, Walter H., Newtonville.

Lancaster, Charles B., Newton.
Lawrence, Amory A., Boston.
Lawrence, Amos A., Boston.
Lawrence, James, Groton.
Lawrence, John, Groton.
Learned, Charles A., Arlington.
Lee, Daniel D., Jamaica Plain.
Lee, Francis H., Salem.
Leeson, Hon. Joseph R., Newton Centre.
Lemme, Frederick, Charlestown.
Leuchars, Robert B., Brookline.
Lewis, William G., Framingham.
Lincoln, George, Hingham.

Lincoln, Col. Solomon, Boston.
Little, James L., Brookline.
Lockwood, Rhodes, Boston.
Lodge, Richard W., Swampscott.
Loftus, John P., Dorchester.
Loomis, Elihu G., Bedford.
Lothrop, William S. H., Boston.
†Lowder, John, Watertown.
Lowell, Augustus, Boston.
Lumb, William, Boston.
Lunt, William W., Hingham.
Lyman, George H., Wareham.
Lyon, Henry, M.D., Charlestown.

Mabbett, George, Plymouth.
†Mahoney, John, Boston.
Mallet, E. B., Jr., Freeport, Maine.
Mann, James F., Ipswich.
Manning, Jacob W., Reading.
Manning, J. Woodward, Reading.
Manning, Mrs. Lydia B., Reading.
Manning, Robert, Salem.
Manning, Warren H., Brookline.
Marshall, Frederick F., Chelsea.
Marston, Howard, Boston.
Mason, Col. Frederick, Taunton.
Matthews, Nathan, Boston.
May, Frederick W. G., Boston.
McCarty, Timothy, Providence, R.I.
McWilliam, George, Whitinsville.
Melvin, James C., West Newton.
Merriam, Herbert, Weston.
Merrill, Hon. Moody, Roxbury.
Metivier, James, Cambridge.
Milmore, Mrs. Joseph, Washington, D.C.
Minton, James, Boston.
Mitton, Edward J., Brookline.
Mixter, George, Boston.
Monteith, David, Dedham.
Montgomery, Alexander, Natick.
Moore, John H., Concord.
Morgan, George H., New York, N.Y.
†Morse, Samuel F., Boston.
Moseley, Charles H., Dorchester.
Mudge, George A., Portsmouth, N.H.
Murphy, William Bowen, Boston.
Mutch, John, Brookline.

Newman, John R., Winchester.
Newton, Rev. William W., Pittsfield.
Nickerson, George A., Dedham.
Norton, Charles W., Allston.
Norton, Edward E., Boston.

Oakman, Hiram A., North Marshfield.
Olmsted, Frederick Law, Jr., Brookline.
Olmsted, John Charles, Brookline.
Orpet, Edward O., South Lancaster.

Packer, Charles H., Boston.
Paige, Clifton H., Mattapan.
Palmer, Julius A., Jr., Boston.
Parker, Augustus, Roxbury.
Parker, Charles W., Boston.
Partridge, Horace, North Cambridge.
Patten, Marcellus A., Tewksbury.
Paul, Alfred W., Dighton.
Peabody, Francis H., Boston.
Peabody, John E., Boston.
Peck, O. H., Denver, Col.
Peck, William G., Arlington.
Perkins, Edward N., Jamaica Plain.
†Perry, George W., Malden.
Philbrick, William D., Newton Centre.
Pierce, Dean, Brookline.
Pierce, George Francis, Dorchester.
Poor, John R., Boston.
Porter, James C., Wollaston.
Potter, Joseph S., Fredericksburg, Va.
Prang, Louis, Roxbury.
Pratt, Laban, Dorchester.
Pratt, Lucius G., West Newton.
Pratt, Robert M., Boston.
Pray, Dr. Mark W., Boston.
Prescott, Eben C., New York.
Pringle, Cyrus G., Charlotte, Vt.
Prouty, Gardner, Littleton.
Putnam, Joshua H., Newton Centre.

Quinby, Hosea M., M.D., Worcester.

Raddin, Everett W., North Cambridge.
Rand, Miss Elizabeth L., Newton Highlands.
Rand, Harry S., North Cambridge.
Rand, Oliver J., Cambridgeport.
Rawson, Warren W., Arlington.
Ray, James F., Franklin.
Ray, Hon. Joseph G., Franklin.
Raymond, Walter, Boston.
Read, Charles A., Manchester.
Reardon, John B., Boston.
Reed, George W., Boston.
Rice, George C., Worcester.
Richards, John J., Boston.
Richardson, Charles E., Cambridge.
Rinn, J. Ph., Boston.
Ripley, Charles, Dorchester.
Ripley, Ebed L., Hingham Centre.
Robbins, I. Gilbert, Melrose Highlands.
Robinson, John, Salem.
Robinson, Joseph B., Dorchester.
Robinson, Warren J., Somerville.
Ross, Henry, Newtonville.
Ruddick, William H., M.D., South Boston.
Russell, George, Woburn.
Russell, Hon. John E., Leicester.
Russell, Walter, Arlington.

Salisbury, William C. G., Boston.
Sanford, Oliver S., Hyde Park.
Sanger, Mrs. George P., Boston.
Sargent, Charles S., Brookline.
Sawtelle, Eli A., Boston.
Sawyer, Timothy T., Boston.
Scorgie, James C., Cambridge.
†Scott, Charles, Newton.
Sears, Miss Clara E., Boston.
Sears, J. Montgomery, Boston.
Shaler, Nathaniel S., Cambridge.
Shaw, Christopher C., Milford, N.H.
Shorey, John L., Lynn.
Shuman, Hon. A., Roxbury.
Siebrecht, H. A., New Rochelle, N.Y.
Skinner, Francis, Boston.
Smith, Benjamin G., Cambridge.
Smith, Calvin W., Wellesley Hills.
Smith, Charles H., Jamaica Plain.
Smith, Charles S., Lincoln.
Smith, Edward N., San Francisco, Cal.
Smith, George O., Boston.
Smith, Thomas Page, Waltham.
Snow, Eugene A., Melrose.
Souther, Charles H., Jamaica Plain.
Spaulding, Edward, West Newton.
Speare, Alden, Newton Centre.
Spooner, William H., Jamaica Plain.
Sprague, Hon. Charles F., Brookline.
Sprague, Isaac, Wellesley Hills.
Springall, George, Malden.
Stearns, Frank W., Newton.
Stedman, Henry R., M.D., Roslindale.
Stewart, William J., Winchester.
Stone, Charles W., Boston.
Stone, Prof. George E., Amherst.
Stone, George F., Chestnut Hill.
Strater, Herman, Roxbury.
Strong, William C., Waban.
Sturgis, Russell, Manchester.
Swain, Charles E., Roxbury.
Sweet, Everell F., Malden.

Talbot, Mrs. I. Tisdale, Boston.
Tarbell, George G., M.D., Boston.
Taylor, Horace B., Portland, Me.
Temple, Felker L., Boston.
Tenney, C. H., Methuen.
Thompson, Leonard, Woburn.
Thurlow, Thomas C., West Newbury.
Tilton, Stephen W., Roxbury.
Todd, John, Hingham.
Tolman, Benjamin, Concord.
Toppan, Roland W., Malden.
Torrey, Everett, Charlestown.
Trepess, Samuel J., Glencove, L.I., N.Y.

†Turner, John M., Dorchester.
Turner, Roswell W., Boston.

Vander-Woerd, Charles, Waltham.
Vinal, Miss Mary L., Somerville.

Wakefield, E. H., Cambridge.
Walcott, Henry P., M.D., Cambridge.
Waldo, C. Sidney, Jamaica Plain.
Wales, George O., Braintree.
Walker, Miss Mary S., Waltham.
Walley, Mrs. W. P., Boston.
Walsh, Michael H., Wood's Holl.
Walton, Daniel G., Wakefield.
Ward, Francis Jackson, Roxbury.
Ward, John, Newton Centre.
Ware, Benjamin P., Clifton.
Ware, Miss Mary L., Boston.
Washburn, Andrew, Hyde Park.
Watson, Benjamin M., Jamaica Plain.
Watson, Thomas A., East Braintree.
Watts, Isaac, Waverly.
Webber, Aaron D., Boston.
Webster, Hollis, Cambridge.
Weld, Christopher Minot, Jamaica Plain.
Weld, George W., Newport, R.I.
Weld, Richard H., Boston.
West, Mrs. Maria L., Neponset.
Weston, Seth, Revere.
Wheeler, Frank, Concord.
Wheeler, Wilfred, Concord.
Wheelwright, A. C., Brookline.
Whitcomb, William B., Medford.
White, Francis A., Brookline.
White, Joseph H., Brookline.
Whitney, Arthur E., Winchester.
Whitney, Ellerton P., Milton.
Whittier, Hon. Charles, Roxbury.
Whittier, George E., Groton.
Wilbur, George B., West Newton.
Wilder, Edward Baker, Dorchester.
Wilder, Henry A., Malden.
Willard, E. W., Newport, R.I.
Willcutt, Levi L., West Roxbury.
Williams, Aaron D., Boston.
Williams, Benjamin B., Boston.
Williams, Philander, Taunton.
Willis, George W., Chelsea.
Willis, Joshua C., Roxbury.
Wilson, Col. Henry W., Boston.
Wilson, William Power, Boston.
Winthrop, Robert C., Jr., Boston
Wood, Edmund M., Natick.
Wood, William K., West Newton.
Woods, Henry, Boston.
Wright, George C., West Acton.
Wright, John G., Brookline.
Wyman, Oliver B., Shrewsbury.

ANNUAL MEMBERS.

Members of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

Allen, Charles L., Floral Park, N.Y.
Alles, William H., Hyde Park.
Anderson, George M., Milton.
Arnold, Mrs. Anna E., Roxbury.
Arnold, Miss Sarah L., Newton Centre.
Atkinson, Edward, Brookline.
Ayers, Miss Helen F., Medford.

Badlam, William H., Dorchester.
Barker, John G., Melrose.
Barr, John, Wellesley.
Benedict, Washington G., Boston.
Bigelow, Arthur J., Eastlake, Worcester.
Bigelow, Mrs. Nancy J., Southborough.
Bird, John L., Dorchester.
Bliss, Benjamin K., East Bridgewater.
Blomberg, Carl, North Easton.
Bock, William A., North Cambridge.
Bolles, William P., M.D., Roxbury.
Bouvé, Lander M., Brookline.
Boyden, Clarence F., Taunton.
Braman, George H., Newton.
Breck, Charles H., Newton.
Breck, Charles H. B., Brighton.
Brown, David H., West Medford.
Brunton, Frank, Boston.
Butler, Edward, Wellesley.

Carpenter, Frank O., West Roxbury.
Carroll, James T., Chelsea.
Carter, Mrs. Sarah D. J., Wilmington.
Cary, Miss Alice B., Lexington.
Chase, Joseph S., Malden.
Chase, Leverett M., Roxbury.
Chase, Philip A., Lynn.
Chubbuck, Isaac Y., Roxbury.
Clapp, Henry L., Roxbury.
Clark, John W., North Hadley.
Clark, Joseph, Manchester.
Clark, Theodore M., Newtonville.
Clarke, Frederick E., Lawrence.
Clinkaberry, Henry T., Trenton, N.J.
Collins, Frank S., Malden.
Comley, James, Lexington.
Coolidge, David H., Jr., Boston.
Coolidge, Sumner, Mount Auburn.
Cotter, Lawrence, Dorchester.
Cotting, Charles U., Boston.
Councilman, Prof. W. T., Boston.
Crosby, J. Allen, Jamaica Plain.
Curtis, Joseph H., Boston.
Curtis, Louville, Tyngsborough.

Davis, Frederick, Boston.
Davis, Frederick S., West Roxbury.
Dawson, Charles Jackson, Jamaica Plain.
Dolbear, Mrs. Alice J., College Hill.
Doran, Enoch E., Brookline.
Dorr, George B., Boston.
Doyle, William E., East Cambridge.
Duffley, Daniel, Brookline.

Eaton, Warren E., Reading.
Endicott, Miss Charlotte M., Canton.
Ewell, Marshall F., Marshfield Hills.

Fenno, Warren, Revere.
Fisher, Sewall, Framingham.
Fitzgerald, Desmond, Brookline.
Fletcher, Fred W., Auburndale.
Forbes, William H., Jamaica Plain.
Francis, George E., M.D., Worcester.
French, Charles G., Utica, N.Y.
Frost, Artemas, Belmont.
Frost, George, West Newton.
Frost, Varnum, Arlington.
Fuller, T. Otis, Needham.

Gibbon, Mrs. James A., Brookline.
Gill, Mrs. E. M., Medford.
Gilman, Hon. Virgil C., Nashua, N.H.
Grant, Charles E., Concord.
Grew, Henry Sturgis, Boston.
Grey, Thomas J., Chelsea.

Hall, Charles H., M.D., Boston.
Hall, Stacy, Boston.
Hallstram, Charles W., Boston.
Hargraves, William J., Jamaica Plain.
Harris, Frederick L., Wellesley.
Harrison, C. S., York, Nebraska.
Harrison, Thomas, Melrose Highlands.
Hartwell, Samuel, Lincoln.
Hatfield, T. D., Wellesley.
Henshaw, Samuel, West Brighton, N.Y.
Hersey, Alfred H., Hingham.
Hersey, Edmund, Hingham.
Heustis, Warren H., Belmont.
Hill, J. Willard, Belmont.
Hobbs, George M., Boston.
Hollis, George, South Weymouth.
Horton, Herbert A., Brookline.
Houghton, George S., West Newton.
Hubbard, F. Tracey, Cambridge.
Huston, Miss Katharine W., Jamaica Plain.

Ireland, Robert D., Winthrop.

James, Robert Kent, Dorchester.
Jameson, G. W., East Lexington.

Keith, Miss Mary R., Washington, D.C.
Kelsey, Harlan P., Boston.
Kemp, William S., Brookline.
Kennard, Frederic H., Brookline.
Kenrick, Miss Anna C., Newton.

Lancaster, Mrs. E. M., Roxbury.
Lawrence, Henry S., Roxbury.
Lincoln, Miss Agnes W., Medford.
Lomax, George H., Somerville.
Lombard, Richard T., Wayland.
Loring, Charles G., Boston.
Loring, William C., Beverly.
Lothrop, Thornton K., Boston.
Low, Hon. Aaron, Hingham.

Manda, W. A., South Orange, N.J.
Manning, A. Chandler, Reading.
Martin, William J., Milton.
Masten, Cornelius E., Roxbury.
Maynard, Charles, North Easton.
McLaren, Anthony, Westwood.
McMullen, Edgar, Boston.
Meriam, Horatio C., D.M.D., Salem.
Merrill, John J., Roxbury.
Milman, William, Roxbury.
Moody, Abner J., Boston.
Moore, George D., Arlington.
Morgan, George M., Boston.
Morison, George Abbot, Cambridge.
Moseley, Frederick Strong, West Newbury.
Munson, Prof. W. M., Orono, Me.

Newton, John F., Roxbury.
Nicholson, William, Framingham.
Norton, Michael H., Boston.
Norton, Patrick, Dorchester.

Olmsted, Frederick Law, Brookline.

Park, William D., Boston.
Parker, John, Newtonville.
Parker, Walter S., Reading.
Patterson, William, Quincy.
Peirce, George H., Concord Junction.
Petremant, Robert, Brooklyn, N.Y.
Pettigrew, John A., Jamaica Plain.
Pickman, Dudley L., Boston.
Pierce, Mrs. F. A., Brookline.
Plimpton, Willard P., West Newton.
Power, Charles J., South Framingham.
Pray, James Sturgis, Cambridge.
Purdie, George A., Wellesley Hills.

Rea, Charles H., Norwood.
Rea, Frederic J., Norwood.
Rich, Miss Ruth G., Dorchester.
Rich, William E. C., Roxbury.
Rich, William P., Chelsea.
Richards, Mrs. P. D., West Medford.
Robbins, Oliver R., Weston.
Robinson, Walter A., Arlington.
Ross, Charles W., Newtonville.
Ross, Henry Wilson, Newtonville.
Rothwell, James E., Brookline.

Sander, Charles, Brookline.
Saunders, Miss Mary T., Salem.
Sawtelle, J. M., Fitchburg.
Scott, Augustus E., Lexington.
Scudder, Samuel H., Cambridge.
Searles, E. F., Methuen.
Seaver, Edwin P., LL.D., Waban.
Sharp, Miss Helen, Boston.
Sharples, Stephen P., Cambridge.
Shaw, Hon. Edward P., Newburyport.
Shepard, Harvey N., Boston.
Sheppard, Edwin, Lowell.
Smith, Archibald, Somerville.
Southworth, Edward, Quincy.
Squire, Miss Esther A., North Cambridge.
Stearns, Mrs. Charles A., East Watertown.
Stearns, Charles H., Brookline.
Stevens, Mrs. Mary L., Cambridge.
Stevens, Miss Mary O., North Andover.
Stone, Joshua C., Watertown.
Storer, Charles, Providence, R.I.
Story, Miss Sarah W., Brighton.
Sutherland, George A., Roslindale.
Swan, Charles W., M.D., Brookline.

Tailby, Joseph, Wellesley.
Teele, William H., West Acton.
Terry, Rev. Calvin, North Weymouth.
Thatcher, William, Brookline.
Toby, Rufus T., Roxbury.
Travis, Charles B., Brighton.
Tyndale, Theodore H., Brookline.

Vaughan, J. C., Chicago, Ill.

Warren, Samuel H., Weston.
Welch, Patrick, Dorchester.
Wells, Benjamin T., Newtonville.
Westwood, Thomas H., Jamaica Plain.
Wheeler, Henry A., Newtonville.
Wheeler, James, Brookline.
White, Maurice P., Roxbury.
White, W. Henry, Lowell.
Whitney, Joseph, Cambridgeport.
Whiton, Hon. Starkes, Hingham Centre.
Wilkie, Edward A., Newtonville.
Winter, William C., Mansfield.
Wolcott, Mrs. H. L. T., Dedham.
Wood, Mrs. Anna D., West Newton.
Wood, Elijah A., West Newton.
Wood, E. W., West Newton.
Woodford, Joseph H., Boston.
Woods, Henry F., Boston.

Young, Arthur W., Hingham.
Young, Charles S., Newton Centre.
Young, E. Bentley, Boston.

Zirngiebel, Denys, Needham.

EXTRACTS FROM THE CONSTITUTION AND BY-LAWS.

SECTION XXII.

Life Members.

The payment of thirty dollars shall constitute a Life Membership, and exempt the member from all future assessments, and any Annual Member, having paid all dues, may become a Life Member by the payment of twenty dollars in addition thereto.

Annual Membership.

Every Annual Member, before he receives his diploma, or exercises the privileges of a member, shall pay the sum of ten dollars as an admission fee, and shall be subject afterwards to an annual assessment of two dollars.

SECTION XXIII.

Withdrawal or Discontinuance of Membership.

Any member may withdraw from the Society, on giving notice to the Treasurer and paying the amount due from him. Any member who shall neglect for the space of two years to pay his annual assessment, after due notice from the Treasurer, shall cease to be a member. The Treasurer shall give notice of such withdrawals or discontinuances to the Secretary, who shall erase such members' names from the list.

The attention of Annual Members is particularly called to Section XXIII.

HONORARY MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

Information, or any clew to it, is especially desired in regard to Joseph Maxwell, *elected in* 1830, *and* George W. Smith, *elected in* 1851.

Hon. George S. Boutwell, Groton.
H. W. S. Cleveland, Chicago, Ill.
Joseph Jefferson, Buzzard's Bay.
Major L. A. Huguet-Latour, M.P., Montreal, Canada.
Joseph Maxwell, Rio Janeiro, Brazil.
Donald G. Mitchell, New Haven, Conn.
Hon. J. Sterling Morton, Ex-Secretary of Agriculture, Nebraska City, Neb.
Baron R. Von Osten Sacken, Heidelberg, Germany.
Samuel B. Parsons, Flushing, N.Y.
George W. Smith, Boston.
Hon. James Wilson, Secretary of Agriculture, Washington, D.C.

CORRESPONDING MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly reporting to the Secretary the needed corrections.

Information, or any clew to it, is especially desired in regard to Alexander Burton, *elected in* 1829, S. Reynolds, M.D., 1832, *and* Francis Summerest (or Summerer), 1833.

ÉDOUARD ANDRÉ, Editor in Chief of the Revue Horticole, Paris, France.

PROFESSOR L. H. BAILEY, Horticultural Department, Cornell University, Ithaca, N.Y.

JOHN GILBERT BAKER, F.R.S., F.L.S., Keeper of the Herbarium of the Royal Gardens, Kew.

CHARLES BALTET, Président de la Société Horticole, Vigneronne, et Forestière de l'Aube, Troyes, France.

PETER BARR, London, England.

ARCHIBALD F. BARRON, Turnham Green, London, W.

NAPOLEON BAUMANN, Bolwiller, Alsace.

D. W. BEADLE, 303 Crawford St., Toronto, Ontario.

PROFESSOR WILLIAM J. BEAL, Agricultural College, Michigan.

PROSPER J. BERCKMANS, Ex-President of the American Pomological Society, Augusta, Ga.

CHARLES E. BESSEY, Ph.D., Professor of Botany in the Industrial College of the University of Nebraska, Lincoln.

DR. CH. BOLLE, Berlin, Prussia.

JOHN CROUMBIE BROWN, LL.D., Haddington, Scotland.

PROFESSOR J. L. BUDD, Secretary of the Iowa Horticultural Society, Ames.

WILLIAM BULL, Chelsea, England.

F. W. BURBIDGE, M.A., Trinity College Botanic Garden, Dublin, Ireland.

ALEXANDER BURTON, United States Consul at Cadiz, Spain, Philadelphia.

MAXIME CORNU, Director of the Jardin des Plantes, Paris, France.

DANIEL T. CURTIS, Dorchester.

REV. H. HONYWOOD D'OMBRAIN, Westwell Vicarage, Ashford, Kent, England.

MALCOLM DUNN, Dalkeith, Scotland.

W. T. THISELTON DYER, C.M.G., F.R.S., Director of the Royal Botanic Gardens, Kew, England.

PARKER EARLE, President of the American Horticultural Society, Roswell, N.M.

GEORGE ELLWANGER, Rochester, N.Y.

HENRY JOHN ELWES, F.L.S., F.Z.S., Colesborn, Andoversford, Gloucestershire, England.

WILLIAM G. FARLOW, M.D., Professor of Cryptogamic Botany, Harvard University, Cambridge.

B. E. FERNOW, Forestry School, Cornell University, Ithaca, N.Y.

HON. ROBERT W. FURNAS, Ex-President of the Nebraska State Horticultural Society, Brownville.

CHARLES A. GOESSMANN, Ph.D., LL.D., Chemist of the Hatch Experiment Station of the Massachusetts Agricultural College, Amherst.

GEORGE L. GOODALE, M.D., Professor of Botany, Harvard University, Cambridge.

OBADIAH B. HADWEN, President of the Worcester County Horticultural Society, Worcester.

PROFESSOR BYRON D. HALSTED, Botanist and Horticulturist at the New Jersey Agricultural Experiment Station, New Brunswick, N.J.

J. H. HART, Superintendent of the Botanic Garden, Trinidad.

DR. F. M. HEXAMER, Editor of the American Agriculturist, New York.

J. W. HOFFMANN, Colored State University, Orangeburg, S.C.

J. C. HOLDING, Ex-Treasurer and Secretary of the Cape of Good Hope Agricultural Society, Cape Town, Africa.

THE VERY REV. S. REYNOLDS HOLE, D.D., Dean of Rochester, Rochester, England.

SIR JOSEPH HOOKER, K.C.S.I., The Camp, Sunningdale, England.

JOSIAH HOOPES, West Chester, Pa.

GEORGE HUSMANN, Napa, Cal.

WILLIAM J. JOHNSON, M.D., Fort Gaines, Ga.

CHARLES JOLY, Vice-President of the Société Nationale d'Horticulture de France, Paris.

SIR GEORGE KING, Superintendent of the Royal Botanic Garden, Calcutta.

PROFESSOR WILLIAM R. LAZENBY, Department of Horticulture and Forestry; Secretary College of Agriculture and Domestic Science, Ohio State University, Columbus, O.

MAX LEICHTLIN, Baden-Baden, Germany.

G. F. B. LEIGHTON, President of the Norfolk Horticultural and Pomological Society, Norfolk, Va.

VICTOR LEMOINE, Nancy, France.

T. T. LYON, President of the Michigan Horticultural Society, South Haven.

DR. PETER MACOWAN, Director of the Botanic Garden, Cape Town, Africa.

DR. MAXWELL T. MASTERS, Editor of the Gardeners' Chronicle, London.

GEORGE MAW, Benthal, Kinley, Surrey, England.

T. C. MAXWELL, Geneva, N.Y.

THOMAS MEEHAN, Germantown, Pa.

DR. CHARLES MOHR, Mobile, Ala.

F. W. MOORE, A.L.S., Curator of the Royal Botanic Gardens, Glasnevin, Dublin, Ireland.

DR. DANIEL MORRIS, C.M.G., D.Sc., M.A., F.L.S., Assistant Director of the Royal Botanic Gardens, Kew, England.

CH. NAUDIN, Antibes, France.
GEORGE NICHOLSON, Curator of the Royal Gardens, Kew, England.
PETER NØVIK, Secretary of the Norwegian Horticultural Society, Christiania.
WILLIAM PAUL, Waltham Cross, London, N.
PROFESSOR D. P. PENHALLOW, Director of the Botanic Garden, Montreal, Canada.
HENRY PROBASCO, Cincinnati, O.
P. T. QUINN, Newark, N.J.
CAVALIÈRE ENRICO RAGUSA, Palermo, Sicily.
D. REDMOND, Ocean Springs, Miss.
S. REYNOLDS, M.D., Schenectady, N.Y.
BENJAMIN LINCOLN ROBINSON, Ph.D., Curator of the Gray Herbarium of Harvard University, Cambridge.
WILLIAM ROBINSON, Editor of The Garden, London.
EDGAR SANDERS, Chicago, Ill.
WILLIAM SAUNDERS, Horticulturist and Superintendent of Garden and Grounds, Department of Agriculture, Washington, D.C.
WILLIAM R. SMITH, Superintendent of the Botanic Garden, Washington, D.C.
ROBERT W. STARR, Port William, N.S.
DR. JOSEPH STAYMAN, Leavenworth, Kan.
WILLIAM SUMNER, Pomaria, S.C.
FRANCIS SUMMEREST.
WILLIAM TRELEASE, Director of the Missouri Botanic Garden, St. Louis.
DR. MELCHIOR TREUB, Director of the Botanic Garden, Buitenzorg, Java.
H. J. VEITCH, Chelsea, England.
HENRY L. DE VILMORIN, Secretary of the Société Nationale d'Agriculture de France, Paris.
WILLIAM WATSON, Assistant Curator of the Royal Gardens, Kew, England.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1899.

PART I.

BOSTON:
PRINTED FOR THE SOCIETY.
1899.

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The following lectures have been circulated to some extent in the form of slips reprinted from the reports made by the Secretary of the Society in the "Boston Evening Transcript." As here presented, the lectures are, as far as possible, printed in full, and reports of the discussions following the lectures are added, these, where it appeared necessary, having been carefully revised by the speakers.

The Committee on Lectures and Publication take this opportunity to repeat what they have before stated, that the Society is not to be held responsible for the certainty of the statements, the correctness of the opinions, or the accuracy of the nomenclature, in the lectures and discussions now or heretofore published, all of which must rest on the credit or judgment of the respective writers or speakers, the Society undertaking only to present these papers and discussions, or the substance of them, correctly.

AARON LOW,
J. H. BOWDITCH,
E. W. WOOD,
Committee on Lectures and Publication.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, January 7, 1899.

A stated meeting of the Society was holden today at eleven o'clock, the President in the chair.

This being the commencement of the term of office of the new board of Officers and Standing Committees, the President, FRANCIS H. APPLETON, delivered the usual annual address, as follows:

ADDRESS OF PRESIDENT APPLETON.

Members of the Massachusetts Horticultural Society:

The question again comes before me, What can I say to you that shall sufficiently tell you a story of our more recent work, and which you may not learn through the respective reports of the Secretary and Librarian, Treasurer and Superintendent of Building, and our several Committees — and which story shall tend to promote the chartered objects of this Society?

Permit me first to go back to a period when the matter of promoting better agriculture by organized effort was early planned, after a brief reference to the most systematic organized effort that we have before us, in this nation, at the present time.

At the United States Department of Agriculture, in Washington, we find, under its title, a most complete classification for all the working Bureaus and Divisions, and they doing scientific and practical work, earnestly directed, from the Secretary's (a Cabinet officer) office down, in their aim to do all that seems wise to

advance and protect the many agricultural industries throughout this extensive Nation.

So important a work is that of the Department of Agriculture, with its collections, from a business standpoint, that more substantial fireproof buildings, with greater economic arrangement of the interior than now exists, have from time to time been advised; and such advice should be given most careful thought and planning preparatory to the hoped-for time when Congress shall in due course authorize such improvements as shall be deemed wise.

In said Department horticultural matters have their place in the appropriate Bureaus and Divisions, as we recognize them in our varied work here by Committee designations, and in our Prize Lists, and otherwise.

Shortly before 1790 the men of government and business, General Washington and those who were his near associates, saw that the agricultural interests of the Nation — and the term "agricultural" was used in its broad sense — needed the stimulus of organization to advance the character and quantity of its products in order better to supply the markets of our land.

In New York, Massachusetts, Pennsylvania, and South Carolina, influential men of those States, in their centres of business, organized societies for the promotion of agriculture in its varied forms. The early agricultural societies, with their occasional — or annual — assembling of persons on Market or Fair Day, became promoters of agriculture and trade, composed in their membership of business and professional men of that period, who were closely in touch with the best financial methods and needs, and who had the general welfare of the Nation and State at heart.

At those assemblages, in the interest of agriculture (farming and horticulture, etc.), we have evidence that the participants had a care for the wise conduct of affairs of state, and that the selection of men of high character and well-directed purpose was not lost sight of as a factor in the advancement of the leading charge confided to their care.

They realized that public and private affairs were in the most wholesome condition when public office was administered most wisely.

In our own State a Society for Promoting Agriculture was

established in 1792, and, by its early influence, similar, but more local bodies were soon organized to promote the good work throughout the State, which enlisted the leading men of business in most of our counties. The publication then known as the "New England Farmer" was an early mouthpiece of these efforts, as were also the earliest publications of the parent Society.

Much was there published from the pen of the best informed men of those days to promote better work, more intelligent work; to encourage invention in the line of agricultural implements, or the importation of implements and live stock better adapted to the needs of our people, etc. Market gardening and general horticulture are a natural outgrowth of more intensive farming, and more intensive farming is the profitable type of farming for our New England agriculturist to adopt in his own and the State's interest.

Turning to the founding of this Society, we find, among those who were at the first meeting, men who, as patriot-farmers, had been interested in the establishing of the earliest agricultural societies, with the Hon. John Lowell in the chair. General H. A. S. Dearborn, of Roxbury, of horticultural fame, became first President, and drafted the first constitution; and the State was well represented in our early membership.

This Society first existed as a collection of active members, with little property, and members were sought and needed to give to the Society the living strength that was essential to its chartered objects. The activity and ability of that earnest early membership was then our capital, but money was sought to enhance possibilities in other directions.

Whatever simple prizes were early offered proved a great spur to improved horticulture, and stimulated a largely increased interest in horticulture among our men of wealth, and commercial growers. Without the former, horticulture would have advanced slowly indeed.

The demand for a high quality of products was an important result; and the Boston and Massachusetts markets responded in a manner that has always been a credit and an honor to this State.

Today, with the splendid record of success that this Society has achieved since the 17th of March, 1829, — seventy years, — measured by the results it can claim to have attained in many ways, by

the superb library of publications that has been wisely accumulated for horticultural study, with its unique card catalogue of plates, as well as card catalogue of other contents, and with its real estate on this site, all of which is forever dedicated to the cause of charitable horticultural advancement, as the Act of Incorporation states, — which is "for the purpose of encouraging and improving the science and practice of horticulture, and promoting the amelioration of the various species of trees, fruits, plants, and vegetables, and the introduction of new species and varieties; . . . to receive donations, bequests, and devises for promoting the objects of said Society," — today, I repeat, the Society has much to be proud of. With the influence that its exhibits have exercised around us, with the value to individuals that the Society has been by holding before all people a high standard of excellence as to what can and should be striven for, — with all these characteristics, the honor and value in our membership have greatly enhanced.

Thus also is the importance to the community of this Society to be gauged and appreciated.

While serving for several years upon your Library Committee, I became familiar with the great benefits that would result from increased shelf room; and then, at the request of that Committee, you approved of suggested improvements that gave a gallery, and consequent additional shelves. A wise continuity of purchases must be made to keep useful sets of publications complete; and the purchase of needed works, when a chance offers, is an important factor in keeping your library up to date. Its natural increase is inevitable, unless it is allowed to deteriorate, and it is safe to say that the latter is not your wish, so far as is wisely within our ability.

A variety of ideas for improving the accommodation for the general purposes of our Society have from time to time been presented to your Executive Committee, or the Society, in which I have taken part. All have been either in the direction of an improvement of the present site, or a change of site, with, in either case, far better and more liberal general accommodations. All have had my approval from a certain standpoint, but it has been decided inexpedient and undesirable to adopt either plan. The noise which surrounds this building, and which has been a great detriment to our work, could be greatly mitigated were a

smoother pavement to be laid on the adjoining streets, and such would seem to be a prospective benefit to all occupants of buildings in our neighborhood. Our work is of such a *pro bono publico* character that, with a fair concurrence of those owning and occupying buildings around us, is it not reasonable to suppose that the City would grant us a hearing, with the prospect of a favorable result in this direction?

Would that it might be possible for rubber tires to be required for *all city* vehicles, and rubber heels on shoes for all city horses! Thus, until automobile vehicles come into general use, the condition of the inhabitant of the city would become mitigated by more restful surroundings.

Would not such conditions delight *our* audiences, and spur on the workers in our midst in their charitable horticultural efforts while we remain at this location?

A certain guidance and control of the direction of city traffic, with paving on the several streets and boulevards suited to their several chief uses, is, I believe, found useful from both commercial and sanitary points of view in some parts of the world, and seems an appropriate thought at this time, and a respectful suggestion for the consideration of others.

Some years ago, I am informed, the authorities having in charge the State's newly made Back Bay land made a most attractive offer to this Society (I have been told without cost) of one-half of the square of land where the Institute of Technology now stands, if they would occupy it. Acceptance was then deemed against the Society's interest, and the offer was declined from necessity.

Should such a proposition come from State or City, at some future time, where the work of this Society could be conducted under its chartered obligations, with administration and library rooms in a main structure, and with an exhibition hall of ample size and well lighted attached upon the ground level, we might find a fortunate status confronting us.

With an exhibition hall into which teams, carrying plants, could be driven, and there unloaded safely from risk of frost, and where, at times of exhibitions, the aisles would be broad enough to allow invalid chairs to be pushed without undue inconvenience to pedestrians, we should possess that ideal condition of which few other localities could boast.

But this or any other change of location can only be possible when our present quarters are desired much more by others than by ourselves. Inducements in this direction have been courted without yet meeting with sufficient success.

The Royal (national) Agricultural Society of England publishes quarterly bulletins, which form their Transactions, and which are so much in demand at sale by non-members that they are a source of income to that Society, and are issued with perfect regularity.

Why should not our Society aim to establish her Transactions upon such a basis, in due time, that they shall become as desirable in their chosen line, and in proportion to our resources, as are the English Agricultural Society's in their chosen line? Whether they filled a place before the public that would be helpful and desirable would, in part, be shown by the demand for them, and from the amount of receipts from their sale.

At least let all who now contribute to their contents or their making combine to secure the prompt issue, in proper time, of what we now publish, which certainly can be easily possible if all will remember that promptness of action, and presentation of all papers and reports in form for the printer, are necessary factors.

Certainly our members can demand the receipt of Transactions on time; otherwise they become of inferior value, and proportionately a discredit to the Society.

My intimate connection, first, with the Bussey Institution at Harvard University for several years, and later with the State's Agricultural College and Experiment Stations, for a longer time, while my interest in these institutions still continues, enables me to bear witness to the excellent work done there for the cause of horticulture and for those who would be trained in agricultural principles, or taught to become working horticulturists. I must be permitted here to call special attention to that work which is being so earnestly done at Amherst and at said University, and which is in line with the chartered objects of our Society. There is ample room for all that can be accomplished to advance the knowledge of horticulture and horticultural methods at both places; and I believe that there is no line of work, if wisely applied, that can do more to advance the conditions of the surface of this Bay State, Massachusetts, directly

and intensively, that can be cultivated, which would conduce to a more intensive or a much higher quality of farming also.

All this will benefit Massachusetts because the surface of Massachusetts — her soil and its natural growth — yield most profit from intensive treatment, intelligent treatment, and the application of the results of scientific, beneficial investigations, and study that practical application has proved useful.

The interest in School Gardens and Children's Herbariums has increased much of recent years. At the last exhibition, in December, 1896, there was not space enough in both halls for the display of the children's herbariums. The quality of the work is reported excellent by the Committee. This yearly exhibition affords botanists an opportunity to study the variations of plants grown under different conditions, and to refresh their memories with views of plants not commonly seen, under favorable conditions. The gathering of such collections incites children to begin the study of plants, and is a great influence in cultivating the powers of observation, which are useful factors in advanced study and in after life. Its educational value is plain, and the regular succession of voluntary exhibitors shows that this value is appreciated by parents and those who are interested in the proper education of children.

The study of living plants in a school garden, though more difficult to start and sustain, has still greater value. But many plants can only be studied in the dry state and with colored plates. Without life and growth horticultural pursuits are impossible, and the reports of the establishment of children's gardens, as is the case, are encouraging and indicative of the widespread influence of this Horticultural Society.

I am one who believes that the courses of instruction in our more rural schools would be much more useful to their students if more of the teachers there were trained to understand, and were directed to teach, the natural sciences; and to train those young minds more by teaching them of the wonderful ways that Nature works in, in many objects all about them.

Applicants for admission to our agricultural, farming, and horticultural institutions of learning are too often placed at a considerable disadvantage on account of no knowledge of those rudimentary studies that not only would help them better to understand more advanced instruction, but would enable them the

better to understand the practical work upon their own homes did they elect to remain there and take part in this care; this latter in addition to the increased power of observation that I have already mentioned.

Recognizing, as we do in our Society, the value of herbariums, I wish to take this opportunity to call attention to the merits and needs of the Gray Herbarium of Harvard University. This large collection of scientific specimens of plants has been developed through a long period of years, and with great care. It has formed the basis for the publication of many of the best botanical works produced in America, and its staff has for years been ever ready to give expert determinations of plants submitted for identification. The importance of having in our region an establishment of this kind should be clear, not only to botanists, but to all who are interested in horticulture, pharmacy, or any other occupation in which critical discrimination of plants is of fundamental importance. Through the scientific activity at the Gray Herbarium hundreds of newly discovered plants have been described and classified. Many of the species thus brought to light have a high value in horticulture, while others possess important therapeutic qualities. There is still much to be done in this way, and good reason to believe that the further scientific classification of plants — by bringing out species of economic value, new drugs, important acquisitions for horticulture and agriculture — will contribute much to human welfare and happiness. For these reasons it should be a matter of interest that one of the oldest, largest, and most thoroughly equipped herbariums in America should receive the support of which it now stands in pressing need.

During the past year we have authorized a permanent Committee on Forestry and Roadside Improvement, composed of most competent men, but it has been found difficult to prepare any form of action as yet. Perhaps legislative matters may be so presented that opportunities will be soon offered which will invite the action of the Society through our Committee.

Forestry and roadside improvements are most important factors in the teaching of economic action and care in the State's agricultural conditions. We must study probable future needs to decide what is best for us to do today in such matters, and be influenced by past experiences, in our own and other countries, in coming to conclusions.

In terminating these brief words of address I want to express, first, a regret. I had tried to find some complete account of those homes and gardens of early Boston which were once conspicuous for their distinguished architectural effect in the buildings and fences, and which marked an early period of horticultural beauty, effort, and appreciation of that art. My regret is that *in no single work* have I found so complete a collection of descriptions of those historic homes and gardens as is deserved by the facts.

Such a publication is certainly an omission in the history of this city, which, I believe, has made and is still to make history for itself of a truly noted and advanced character, considered æsthetically as well as from a business standpoint.

A beautiful work upon the more recent public buildings in this city has lately issued; may it be possible for a parallel work to issue on the historic subject to which I have referred? Had the "touch the button and it does the rest" kodak existed, in those early days, many such a work would have issued long ago; but memory must now be the kodak from whose films alone can such a work be completed.

And in conclusion, fellow-members, while we continue to remain in this building, and on this site, we must adapt ourselves to it as best we can; and make the most of its opportunities, overriding its inconveniences, if we cannot eliminate them.

I have been helped by a considerable number of people in presenting to you the several plans that I had hoped might be possible of execution, and I desire to thank them for their unsuccessful coöperation.

It is possible that a temporary stack-room for books, above our stairway in the front hall, with openings from the gallery, might relieve the very congested condition of our books, and bring many volumes into use that now are buried and sought for. I ask that the Library Committee give this matter consideration again.

Let me appeal to the Chairmen of all Committees again, to have all lectures and their reports ready early for the printer, so that they may not be a factor to prevent the prompt issue, in future, of our Transactions.

I have deemed it a distinguished honor to be permitted to hold the office of President for what will have been — God willing —

four years on Jan. 1, 1900, and I trust that this last year before we commence on the nineteen hundreds may see good work done to promote that which will be best for this Society under its chartered objects.

Hon. Virgil C. Gilman moved that the thanks of the Society be presented to the President for his annual address, valuable both for its historical information and its practical suggestions. This motion was unanimously passed, the question being put by Vice-President Benjamin P. Ware. The President briefly expressed his pleasure at the appreciation by the Society of his address.

The appropriations reported by the Executive Committee on the first Saturday in November, 1898, came up for final action, and were unanimously voted, as follows:

For Prizes and Gratuities for the year 1899:

For Plants	$2,000
For Flowers	2,668
For Fruits	1,732
For Vegetables	1,200
For Gardens, Greenhouses, etc.	500
Total	$8,100

The President, as Chairman of the Executive Committee, reported a recommendation that the Society make the following further appropriations for the year 1899:

For Gratuities for Native Plants	$50
For the increase and preservation of the Library	1,000
For the Committee on Lectures and Publication, this sum to include the income of the John Lewis Russell Fund	300
For the Committee of Arrangements, this sum to cover all extraordinary expenses of said Committee	400
For the Committee on School Gardens and Children's Herbariums, this sum to cover all incidental expenses of said Committee, and to be paid through the usual channels	250
For the salaries of the Treasurer and Superintendent and Secretary and Librarian	3,000

This report was unanimously adopted, and the appropriations recommended were voted.

The President, as Chairman of the Executive Committee, reported that that Committee had appointed Charles E. Richardson Treasurer and Superintendent of the Building, and Robert Manning Secretary and Librarian, for the year 1899.

Joseph H. Woodford announced the decease of Charles N. Brackett, for thirty-two years Chairman of the Committee on Vegetables, and nominated Warren Howard Heustis as Chairman of the Committee on Vegetables, and Joshua C. Stone to fill the vacancy in the Committee. After some discussion it was voted that the Secretary cast one ballot for these gentlemen, which was done, and they were declared by the Chair to be duly elected.

On motion of William C. Strong, it was voted that the Chair appoint a Committee of three to prepare a memorial of Mr. Brackett, and Mr. Woodford, Mr. Heustis, and Varnum Frost were accordingly appointed.

On motion of Henry L. Clapp, Chairman of the Committee on School Gardens and Children's Herbariums, it was voted that all premiums and gratuities awarded by that Committee be payable on the first of January, after such awards are made, as are all other awards.

The President added William P. Rich to the Committee on School Gardens and Children's Herbariums.

It was announced that the Schedule of Prizes for 1899 was ready, and also that a statement of the changes therein from the schedule for 1898 had been printed for distribution.

Also that the programme of lectures for the season of 1899 was ready, and the first lecture was announced by the President.

The meeting then adjourned to Saturday, February 4.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 14, 1899.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

This lecture was delivered on the John Lewis Russell foundation. The Committee regret that they are unable to present more than the following synopsis of it:

ANCIENT AND MODERN THEORIES OF DISEASE, WITH SPECIAL REFERENCE TO DISEASES OF PLANTS CAUSED BY PARASITIC FUNGI.

By WILLIAM T. SEDGWICK, Professor of Biology, Massachusetts Institute of Technology, Boston.

Perhaps next in importance among the great scientific discoveries of the century to the establishment of the theory of evolution has been our progress in the knowledge and interpretation of disease, whether of plants or of animals. In this direction the change in our point of view within the last hundred years has been enormous, and it is interesting and instructive to review briefly the history of opinion in regard to the causes of disease. Before doing this, however, we shall do well to remember that zoölogy and botany are now regarded not merely as distinct sciences, but also as hemispheres of one greater science, biology. In order to show the practical value of this point of view it need only be remembered that if plant life and animal life are, as we now believe, essentially similar, plant diseases and animal diseases may well resemble each other not only in character, but also in origin, and even as regards prevention.

Assuming the fundamental similarity of constitution and behavior which it is now admitted prevails between plants and animals, we must next remember that, in the words of Huxley, "the fundamental conception of a living body as a physical mechanism . . . is the distinctive feature of modern as contrasted with ancient physiology." Health and disease thus become to physiologists terms of precise and definite meaning, indicating, as they do, actual states or conditions of a living body. A moment's consideration will show that it is essentially no more difficult to comprehend the idea of a general state or condition of

a living body than a general state or condition of a lifeless body, such as a stone, a piece of iron, a watch, or a locomotive. Very much in the same sense that a watch is a time-piece, a living body is a life-piece. If a watch appears to be in good order and running well, we say that it is a good and normal time-piece, and if a plant appears to be in good order and doing well, we call it a normal or healthy plant, but if it is out of order, or not doing well, we say that it is in a state of disease. Health thus becomes the normal and disease the abnormal condition of the living mechanism. Again, the living machine may wear out. No matter how well cared for or how cleverly managed, old age finally creeps over it; and death is the final stoppage of the vital machinery.

A modern, scientific, and helpful view of the causes of disease is one which classifies them according to their place of origin and regards them as either (a) Intrinsic, or arising from within the body proper; or (b) Extrinsic, or arising outside the body or acting upon it from without. In other words, diseases may be held to be due either to defects in the constitution or construction of the vital mechanism — its timber or its workmanship — or else to external or unfavorable influences acting upon it. In other words, diseases may be said to be, according to their place of origin, either Constitutional or Environmental.

The human race in its development has held various and curious theories of disease both in respect to the diseases of plants and those of animals, but especially the latter. Savages and barbarous peoples, being eminently subjective, interpret diseased states or conditions as perversions of conditions like their own, with which, of course, they are most familiar. If, for example, they observe a person who is inattentive, unresponsive, or otherwise peculiar, they are apt to think of him as "absent-minded," or "out of his head;" but if absent-minded or out of his head, what more natural than that some demon should enter his head, take his place, and act strangely, or cause his body to act strangely in his absence. In this way savages and others have accounted for lunacy, hysteria, epilepsy, and delirium; and traces of such theorizing are common even today.

In the classical period a more physical and mechanical idea, one more in harmony with nature, prevailed, but yet sufficiently strange. This was the famous theory of the four humors. Traces of it linger until today. This theory supposed that health

consists in the proper mixture, and disease in the improper mixture, of four juices of the body, namely, blood, phlegm, yellow bile, and black bile, and today, even, we hear not infrequently of the "sanguine" temperament, the "phlegmatic" temperament, and the "melancholy" (black-bile) temperament.

With the growth of science and the study of health and disease, especially the study of anatomy and physiology, in the sixteenth and seventeenth centuries, the modern idea of the organism, whether plant or animal, as a physical mechanism, gradually grew up and our modern idea of the constitution or construction of the plant or animal body came into being. Little by little also the idea of the close relationship which subsists between organisms and their environments was developed, and when, in 1839, a disease of the scalp of man was traced to a parasitic fungus, while another fungus was found to be the cause of an infectious disease of silkworms, the foundations were laid for the modern "germ" theory of infectious diseases, which regards such diseases as due to microscopic organisms, many of them parastic fungi operating upon the plant or animal body from the environment.

A recognition of the dependence of plants upon environmental conditions was of course very ancient. We are told in the Bible of the barren fig tree which was saved, temporarily at least, from destruction by the proposition of the gardener to alter its environmental conditions by digging about and dunging it. We even have a recognition of parasitism in the case of the gourd which grew up and sheltered Jonah while he impatiently waited for the destruction of Nineveh, inasmuch as it was a worm which was sent in the night to attack and destroy the gourd. It is said that Pliny recognized the parasitism of the mistletoe. Very early, also, the excrescences which appear upon trees and other plants were interpreted as parasites, or at least as monsters, by virtue of their obvious analogy to certain so-called parasitic growths attached to human monsters. The term "parasite," although so common now in botany, is derived from animal life, a parasite being a person who, unbidden, eats beside another. The term is said to have been introduced in its modern sense into botany as recently as 1720. The microscope was a necessity before it was possible to discover most parasitic fungi.

Parasites were for a long time confounded with epiphytes. Parasitism seems, indeed, not necessarily, as is usually supposed,

an abnormal and strange development, at least in its beginnings, but simply a natural result of the universal struggle for existence. If, in the search for food, a plant or animal happens to come in contact with and feed upon another, it may easily happen that it shall gain great profit, but if this habit becomes so extended as to lead to the destruction of the host, obviously the parasite itself will also perish. It is easy to suppose that parasitism may have arisen from saprophytism, in which plants and animals feeding upon dead or waste organic matters happened to attach themselves to living plants or animals; and it is easy to see how, under these circumstances, great advantage might accrue to the saprophyte. It is even possible to imagine how the ranks of parasites, thinned by the destruction of their hosts, or otherwise, might be continually recruited from among the saprophytes.

The parasitic fungi have long been known in special cases to penetrate the tissues of their host. It has also been known that in their doing of this some solvent reagent was secreted by the fungus, and recent experiments of much interest have shown that it is possible to separate from particular fungi substances which will corrode and destroy vegetable tissues such as are attacked by similar fungi. The analogy here discoverable between the toxins of bacteria and these solvent reagents, or tissue-poisons, is very close, and we are obliged today to employ a similar term to describe the precise action of parasitic fungi to that now employed in bacteriology and to call the diseases which they produce not merely "zymotic," but rather "zymotoxic."

The chief practical importance of a clear understanding of the terms "health" and "disease" in botany is that we may the more readily comprehend the lines along which prevention of disease and the promotion of health must work. Obviously there are two directions, and only two. First, in the improvement of the mechanism, and second, in the control and amelioration of the environment. The former is a problem for plant physiologists for plant diseases, precisely as it is one for animal physiologists for animal diseases. The latter bears the same relation to plant life that sanitary science does to animal life, and there is reason to believe that the next few years will witness immense progress in the field of preventive medicine, or vegetable sanitation, for plant diseases. Sanitary science for plant life must follow essentially the same lines as for animal life. The prevention of the environmental

diseases of plants will consist in the one case, as in the other, largely in the control of parasites and the study of proper atmospheric or other environmental conditions, such as food and drink. It must consist in the promotion of cleanness, in the provision of a water supply free from infectious material, in the use of clean and wholesome utensils, in the abatement of dust, and the avoidance of infection from all sources.

Side by side with this control or amelioration of the environment will go eventually an important series of studies in the improvement of the organism itself considered as a physical mechanism. Unlike the history of the betterment of animal life, progress has been thus far in the improvement of plant life greater, perhaps, on the constitutional side, the destruction of the weak and sickly being tolerated among plants more even than among domestic animals, while it is absolutely out of the question in the human species. The greatest immediate improvement, therefore, in the control of the activities of parasitic fungi is likely to be along those lines where the greatest progress has already been made in animal sanitation, namely, in the control and improvement of the environment and in the establishment of a veritable hygiene or sanitary science for plant life. Whether this will go so far as to lead to the reënforcement of the organism by the antitoxins which shall neutralize the poisonous effects of the toxins produced by parasitic fungi or other enemies of plant life remains to be seen, but it is by no means impossible.

On motion of Benjamin P. Ware, introduced by brief complimentary remarks, a vote of thanks was given to Professor Sedgwick for his interesting and instructive address.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 21, 1899.

A meeting for Lecture and Discussion was holden today at eleven o'clock. Neither the President nor either of the Vice-Presidents being present, Ex-President WILLIAM C. STRONG was elected chairman *pro tem.*

The following lecture was delivered:

Experimental Work in Field and Garden.

By Hon. Aaron Low, Hingham.

Mr. President and Members of the Massachusetts Horticultural Society:

In conducting experimental work on agricultural subjects there are so many contingencies to be taken into consideration, as to the changes of each season, that to demonstrate fully the value of any series of experiments they should be conducted through a number of years.

In an experiment conducted in a season like the one just past, which for the larger part was unusually moist, and with but a comparatively small amount of sunshine, the conditions of strong, healthy growth are wanting, and experiments conducted under such circumstances will surely fail of being satisfactory.

Every one who has studied into nature's laws finds how unerringly those laws perform the duties for which they were created.

In experiments the past season with varieties of vegetables, which, to grow successfully, and insure the development of the best qualities, must have an abundance of sunshine, they must, in the lack of that condition, have proved inferior in quality and product.

As the object of this paper is to give the results of experiments the past season with a variety of vegetables, there may be something learned from failures as well as from the most successful results.

I will, therefore, give you briefly a statement of the several experiments, and if there are points which may be of benefit to you in your future farming operations, the experiments will not have been made in vain.

As the experiments were made on but few of the many kinds cultivated, if those present desire to discuss the merit of any of those varieties omitted, we shall be pleased to do so; also, any question connected with the experiments given I will gladly answer.

Experiment No. 1. — As the Pea is one of the first vegetables to be planted in the spring, and quite an important crop for early marketing, I would first call your attention to an experiment in its cultivation.

A piece of light sandy soil was ploughed April 16th and planted on the 17th as follows: Rows were furrowed three feet apart; blood, bone, and potash fertilizer was scattered in the drills and well mixed with the soil. The varieties planted were two rows of Alaska, two rows of Nott's Excelsior, and two rows of Advancer. The vines grew finely and bore abundantly. The Alaska was the earliest, giving peas well-filled June 20th. Nott's Excelsior June 23d. The Advancers were not in condition for picking until July 6th. Nott's Excelsior is similar to the American Wonder in size of pod and fineness of quality, but as it is a much stronger-growing variety it will be likely to supersede the Wonder. The second plot in my pea experiment was planted some ten days later, and the All Soluble brand of fertilizer was used. The varieties planted were Nott's Excelsior and American Wonder. There was not much apparent difference in the two varieties except in the stronger-growing vine of the Excelsior. The All Soluble fertilizer is very quick in its action upon crops, but appears deficient in carrying them out to the end of the season.

Experiment No. 2. — My second experiment in planting was with Sweet Corn. As this was on land alongside of that of the Pea experiment it was ploughed at the same time. On the 29th it was harrowed and furrowed in rows three and one-half feet apart. The fertilizer used was blood, bone, and potash, a handful being dropped in the drills three feet apart, and well mixed with the soil. The corn was dropped on April 30th and covered lightly with a hand hoe. The varieties planted were as follows: two rows each of Early Melrose, Early Champion, Early Crosby, Early Quincy Market, Low's Perfection, Bear's Foot. For so early a planting the seed came up well, and as there were no late frosts to injure it, grew without hindrance. The Quincy Market was a week the earliest, followed by Perfection and Early Melrose. There was no perceptible difference in appearance or earliness between the Early Melrose and Early Champion. Both varieties in color of stalk and manner of growth were so similar, I should decide they were the same variety. Early Crosby, although one of our best kinds, was not as early as I expected. Bear's Foot is a new variety of much promise, having a large stout ear with from sixteen to twenty rows on many ears and, the kernels being very sweet and tender, is well worthy of a trial.

Experiment No. 3. — My third experiment was on Potatoes.

As this crop is one of the most important which the farmer grows, I was desirous of embodying as many points in relation to its culture as possible, in the hope that by varying the usual routine of planting I might acquire some ideas which in the future would be of much benefit.

In the first week of April I selected the most uniform tubers I had of the following kinds: Early Fortune, Early Essex, Pearl of Savoy, Early Harvest, and Early White Ohio, and spreading them out on benches in the glass house left them to the full influence of the heat and sunshine until May, when I saw that the eyes had started nicely, and grown stout green sprouts from half an inch to an inch long.

In placing potatoes under glass always put them out singly, as they must have the full benefit of light as well as heat to start strong green sprouts, which is a very important point, as, if grown light colored, they will rub off very easily, and cannot be handled; while if grown under the full influence of the light the eyes start strong, and they can be handled without injury in putting them out.

As the land on which this experiment was tried was a part of the field of the previous experiments, it was ploughed at the same time. On the 3d of May it was well harrowed, and furrowed in rows three feet apart. Armour's blood, bone, and potash fertilizer was scattered in the rows at the rate of half a ton to the acre, and well mixed with the soil before setting out the potatoes. As this was a special experiment on starting potatoes well before planting out, I did not take the tubers from the glass house until May 4th, when the eyes had strong vigorous sprouts from half an inch to an inch long. The potatoes were carefully cut to two eyes to a piece, and placed in the bottom of the drill one foot apart, and all sprouts covered from two to three inches deep, with light soil.

As the weather was favorable, they soon made their appearance above ground and, not being troubled by late frosts, grew finely. As all the kinds planted were early, the vines seemed to be fully grown before the potato beetles made their appearance, and were not much troubled by them.

The piece was cultivated twice; at the last time the rows were ridged slightly, but no hand hoeing was given. The first potatoes were dug on June 22, and were of good size, smooth and handsome, and of fine quality. The potatoes were all dug by the 20th

of July, and averaged six bushels to a row two hundred feet long, of large, smooth, handsome potatoes, without any signs of scab upon them.

The above experiment was very satisfactory in showing the advantage of starting potatoes very early, as they make most of their growth before the potato beetle appears, and mature the tubers before the blight usually comes.

Of the varieties planted Early Fortune and White Ohio were new. The first named was one of the earliest, and first class in all respects. The Ohio I should not recommend from this trial, as the tubers were small and inferior in quality, while all the others were large and very handsome. The conditions of growth seemed perfectly suited to all the varieties except the Ohio.

Experiment No. 4. My next experiment was also on Potatoes, but was conducted on different lines: First, to determine if possible the difference, if any, in value of Seed Potatoes grown in different latitudes as well as the comparative value of the prominent varieties now in cultivation; Second, to determine the efficiency of various methods to prevent scab on the tubers and blight on the vines.

In accordance with the first part of the experiment I selected the following varieties of potatoes from different latitudes, two rows fifty feet long of each kind:

Early Harvest, from New York.
" " our own seed.
New Queen, from New York.
" " " Maine.
Rural New Yorker, No. 2, from New York.
" " " " " Maine.
Carman, No. 1, from New York.
" " our own seed.
" No. 3, from New York.
" " our own seed.
Rochester Rose, Gregory's seed.
Prolific Rose, " "
Honeoye Rose, from New York.
Enormous, from Vermont.
Uncle Sam, from Henderson, New York.

The potatoes were planted May 15, on commercial fertilizer, scattered in the rows at the rate of 800 lbs. to the acre, and well

mixed by horse and cultivator before dropping the potatoes. They were also covered by horse and cultivator, and all after-cultivation was performed in the same manner.

After the potatoes came up they grew well for a time, but as there was so much wet weather with but little sunshine the vines did not show such a stout, vigorous growth as when conditions are more favorable. Paris green was applied twice as a preventive of the potato beetle. The first week in July there appeared in spots on the vines of the earliest varieties a blight which soon spread over the kinds on which it was first seen. I immediately applied the Bordeaux mixture to the later kinds before the blight was to be seen on the vines, but rain followed in a few hours, washing the application off before it had time to be effective. I again applied the mixture at two different times, but each application was immediately followed by rain, and the effect was much impaired.

The varieties that withstood the blight the longest were Carman No. 1, Carman No. 3, Enormous, and Uncle Sam, all late potatoes.

Although the application of the Bordeaux mixture in this instance was not as effectual as I expected, still I believe that under favorable conditions it would well pay for thorough application early in the season by checking the blight on its first appearance and giving the vines a longer time to perfect their crop.

In preventing the scab on the potato, the remedy most highly recommended is soaking the seed potatoes in a solution of corrosive sublimate for an hour and a half, as per the formula of the Experiment Station at Amherst. Another method of prevention is to scatter flour of sulphur in the rows when the potatoes are planted.

I could not see any perceptible difference in the results of either method, as the potatoes in both cases were free from scab, while where neither was applied many of them were scabby.

The yield of the several varieties was as follows:

The 2 rows of Early Harvest,	N.Y. seed.		2	bushels.
" " " " " "	our own seed.		2¼	"
" " " " New Queen,	N.Y.	"	2½	"
" " " " " "	Me.	"	3	"
" " " " R. N. Y. No. 2,	"	"	2½	"
" " " " " " " " "	N.Y.	"	2¾	"

The 2 rows of Carman No. 1,	N.Y.	seed.	$2\frac{3}{4}$	bushels.
" " " " " " "	own	"	3	"
" " " " " " 3,	"	"	$3\frac{1}{4}$	"
" " " " " " "	N.Y.	"	$2\frac{3}{4}$	"
" " " " Rochester Rose,	Gregory's	"	$3\frac{1}{2}$	"
" " " " Prolific Rose	"	"	3	"
" " " " Honeoye Rose	N.Y.	"	3	"
" " " " Enormous,	Vt.	"	4	"
" " " " Uncle Sam,	N.Y.	"	3	"

The variety giving the largest yield was Enormous, a late potato from Vermont. The next was Rochester Rose, from James J. H. Gregory. The third was Carman No. 3, our own seed.

Within a few years there has been much discussion at farmers' meetings as to the best method of restoring exhausted or worn-out lands to a productive fertility. Experiments have been conducted at Experiment Stations with various plants, to determine their relative value in restoring the needed elements of fertility to the soil. A number of plants have been imported from foreign countries, which were said to be particularly adapted for this purpose in the immense amount of green material they produce for ploughing under. The past two years I have tried a number of those recommended, and will briefly give the results.

Australian Salt Bush. — This is said to flourish and grow in the driest localities, where even grass and other forage plants will not live, and to produce heavy crops of nutritious food for stock. Perhaps from extreme moisture of the past season the result was not as good as I expected; evidently there was too little sunshine for its perfect development. It is of trailing habit, each plant covering the ground for several feet. It has small narrow leaves, thickly set on slender branches. Cattle, sheep, and hogs are very fond of it, and it is said to be exceedingly nutritious. I shall give it another trial, trusting that the season will be more favorable.

Dwarf Essex Rape. — This is a plant highly spoken of for green manuring, producing immense weight for that purpose; it is also said to be twice as nutritious for fattening stock as clover. It can be sown from May until July, is a rapid grower, and will furnish by the middle of September as large a crop as can well be ploughed under. I sowed between one and two acres in June, and when turned under in September it was from one to two feet high.

Rye was immediately sown upon the land, and next May I shall plough under the rye crop, planting the land at once to corn, thus testing the value of green manuring on light sandy soils.

Cow Peas have a very high reputation, especially in the southern part of our country, as a renovator of worn-out lands. They can be sown in May or June, from one to one and one-half bushels per acre, and should be ploughed under as soon as they have made their full growth. They are very prolific in seed, bearing from twenty to twenty-five bushels per acre. The vines are much relished by all farm stock.

Soja Bean. — This is the most highly recommended by the Experiment Stations for ploughing under as green manuring of all known plants. It is the greatest gatherer of nitrogen from the atmosphere during growth; when ploughed under it returns to the soil a large per cent of that element in its most available form. My experience with this the past season was very satisfactory. It grew strong and stocky, and when ready to plough under was two feet high. This seemed to be more hardy to withstand early frosts than the Cow Pea, as the first frost, last fall, killed the peas, but did not harm the beans growing alongside.

The Soja bean can be sown either broadcast or in drills two feet apart. I prefer the latter method, as the cultivator can then be run between the rows, thus keeping the land free from weeds. It is productive of seed, which, ground into meal, is said to be excellent for stock feeding.

Winter Rye. — For a number of years I have practised sowing winter rye on all lands available in the months of August and September, using from one and one-half to two bushels of seed. This will form a thick matted growth before winter sets in, and will be a good protection from the wash of heavy rains or from the soil being blown off by strong winds.

Winter rye, to the farmers of Massachusetts, is more available than any of the plants before noticed. Produced as it is in almost every town, it can be readily and cheaply procured at any time when needed for sowing.

I desire to emphasize the utility of ploughing under green crops, to every farmer who has light, sandy soil, as a restorer of a much needed element of fertility, which long cultivation has largely exhausted. There is no other means by which such lands can be as cheaply and rapidly brought back to productiveness. Another

important point in favor of ploughing under green crops is the marked resistance to drought which crops growing upon it always show. I have often noticed quite a difference in the same field where only a part of the crop was growing on green manuring.

In growing cabbages on land where rye was ploughed in, I have noticed their entire freedom from destructive insects, in marked contrast to lands adjoining on which cabbages were growing without the green manuring, the cultivation in all other respects being the same. On a piece of cabbages grown the past year, every plant set lived and formed a large solid head, which to me was conclusive evidence of its utility.

We often hear farmers and market gardeners say that they have more confidence in the applying of a heavy dressing of stable manure than any of the commercial fertilizers sold in the market. There is no doubt of the reliability of stable manure as applied to the market gardens in the vicinity of large cities. In many cases it costs only the hauling, and, when bought, is got at a very low rate. The farmers and gardeners living out in the country, from fifteen to twenty miles away from the city, cannot afford to buy stable manure at the price usually asked for it, as the cost of teaming and handling, when delivered on his farm, brings it at too high a figure to leave any profit on its use. In an experience of twenty years in using both stable manure and fertilizers on almost all kinds of garden vegetables, I have come to the conclusion that I can grow better crops on the same amount of money's worth of fertilizer than of stable manure.

The question is not as to the reliability of stable manure to produce good crops with the country farmer, but the amount which those crops cost him, and when the cost is more than the product returned he must endeavor to reduce its cost. I firmly believe that farmers, by using a high grade of fertilizers or chemicals, supplemented as it can readily be by ploughing under green crops, can produce most of their crops at a less cost than when using stable manure.

As the object of our Society's meetings is to call out from those present their individual practice and experience, I trust that the paper I have given you will call out a free interchange of your own ideas and experiences upon the subjects noted. I shall be pleased to answer such questions as may be asked in regard to any of the subjects mentioned.

Discussion.

At the close of the lecture the Chairman remarked that the audience had been very much pleased with the lecture.

Thomas Harrison inquired whether the lecturer had ever made use of the manure spreader, which cuts up the manure. He thought that manure spread in the usual way does not give its full effect the first year.

Mr. Low said that some years ago he used the manure spreader; it saved labor and spread the manure in better condition. The time for manuring in hills has passed by.

Varnum Frost inquired what the condition of the soil was.

Mr. Low replied that he came into possession of the land in 1892. From that time it has been cultivated; previously it had had little manure. In such cases the vegetable mould is pretty much exhausted, and green crops ploughed in are as good as manure. If he had a thousand cords of stable manure he would prefer to buy fertilizers to use in growing potatoes, as the tubers are smoother and of better quality.

Some one asked the lecturer whether he could raise poor potatoes on new sward land, and Mr. Low replied that on sward land potatoes are usually good.

George D. Moore asked about ploughing in stable manure lightly in the fall.

Mr. Low said that the gain of ploughing in manure in the fall is that the manure becomes more soluble. This is a great advantage over ploughing it in in the spring; it has become more soluble when it is time to plant.

Mr. Harrison thought that that might be wasteful in light soils, on account of the manure leaching through.

Mr. Low said that it would be safely imprisoned by frost. Nitrogen applied in the fall is thrown away. Nitrogen and potash on rhubarb in the spring will work wonders.

The Chairman asked whether the roots on the potatoes in the glass house struck into the ground where they lay on it.

Mr. Low said that he had had potato eyes sent by mail. He has handled the sprouts when six inches long, and would emphasize putting the tubers out singly in the glass house. He lays them on the earth without any covering, and waters them as you would otherwise. He said he knew a man who many years ago

multiplied the Early Rose to an extraordinary extent by sprouts and cuttings taken from them.

The Chairman said he should suppose that potatoes would make numerous roots where they lay on the ground. Many years ago he propagated the Early Rose potato, beginning with a little more than a peck. He cut the tubers and placed them on sand, from the sprouts he took cuttings, and planted in pots. The tendency of these cuttings was to make numerous roots and many small tubers.

Mr. Low said that the eye that lies on the ground would make many roots and the potato must be turned. Every eye will give a good sprout if rightly managed.

Mr. Low said in answer to an inquiry that it would be just as well to put the tubers on boards if you would water them two or three times a day. If they made many roots there might be danger of the shoots becoming drawn and weak.

Joshua C. Stone said that nobody would deny that it does land good to rest. But where land is so dear as it is in the vicinity of Boston this is impossible. He never lets the land lie idle.

Mr. Low said he had some rye sown in December ploughed under the last week in May when two feet high. He ploughed under a crop of soja bean, and has got four crops of green manure and has lost only one crop. Cow peas absorb nitrogen during growth, and when lying on the ground in winter protect it.

Mr. Stone said that land could be so heavily manured and cropped that it would become worn-out. He calculates to manure all his land twice a year, and applies twenty cords of stable manure to the acre. He would put half his farm down to grass three years and let it rest if he could afford it. It would be the better for the next five years. He said that he did not know about potash, but he puts on extra potash when he thinks the land needs it. He thought he should have less of blight and disease if he could use green fertilizers.

Mr. Frost said he should not think of planting potatoes on old garden soil.

Mr. Low said that he would plant anything that is green for green manuring. He planted two crops, and on one of them there was a crop of weeds which he turned under. The onions that were taken from this last lot were superior to those which were taken from the lot where weeds were not ploughed under. Another plant valuable for green manuring is the vetch.

Walter E. Coburn said that he cut potatoes lengthwise and put the cut side down.

Mr. Low said it would certainly be a good way to do if one had plenty of glass room. He cuts out sprouts with the point of a knife.

Mr. Harrison said that farmers in Canada on one acre of clover could raise 2,000 lbs. of pork. There was no resting of the land and no loss. Hogs will feed on clover.

Mr. Low said that if clover was sown very late in the fall it must be sown again in the spring. It must be well rooted to stand through the winter.

J. H. Woodford said that farmers who use twenty cords of manure per acre fill the ground with manure, and he thought that where that happened it would be better to omit manuring occasionally and dress with lime.

Mr. Low said that when land is surfeited with stable manure lime is beneficial. Manure causes an excess of acid which lime corrects.

Mr. Stone said that he bought a hundred barrels of lime which had been injured by fire. He said that using fertilizer on land was like making mince pies — you could not tell what conditions had led to the results. A farmer might plant a row without manure and you could not tell about the results. Lime is useful, especially on heavy land.

Mr. Harrison thought that lime was of great service in many cases.

Mr. Stone said that the lime which he bought was not hurt for agricultural purposes; it was all in lumps, and he let it slack with rain. Lime which has been slacked three or four months is of no value.

Mr. Low said that corn, crimson clover, Dwarf Essex Rape, or *Lathyrus sylvestris*, will fatten a drove of hogs quickly. By the third year roots will run down twenty-five or thirty feet on the most arid soils.

Mr. Harrison said that he sows rye, cuts it off in the spring, and follows with fodder corn. He had a remarkable crop also in another case.

Mr. Low said that the trouble with rye is that it hardens too quickly, so that the cattle will not eat it.

Mr. Woodford said that alfalfa was grown very largely in Cali-

fornia and the West, and spoke of a case where four acres of alfalfa kept fourteen head of cattle and horses. He asked his son, in Kansas, why he did not grow alfalfa. His son put in alfalfa, and two years afterwards he was pasturing his hogs on this field, and they had no other food. Some of the plants sent their roots down seven or eight feet. His son cut the alfalfa he keeps for haying three times a year. The speaker thought it could be grown here.

Mr. Low said alfalfa was not adapted to our Northern climate. Crimson clover will grow well in summer time, but does not succeed in winter.

Mr. Woodford said that the climate of Kansas was similar to this.

A. W. Cheever said he had tried it many years ago and had cultivated it carefully. It lived for some years, but never amounted to anything. It was not adapted to this climate. Not one in a hundred will succeed with it.

James Fisher said he had known of ten crops being cut in California.

A vote of thanks to Mr. Low was passed for his very practical essay and for the answers which he had so kindly given to the questions asked.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 28, 1899.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following lecture was delivered:

PEACH CULTURE.

By J. H. HALE, South Glastonbury, Conn.

Probably no branch of commercial horticulture is receiving so much attention at the present time as peach orcharding; older residents of this Commonwealth remember the time when peaches for the family supply were an annual production on nearly every farm. To be sure, many of them were seedling varieties of not very high

quality, yet the most luscious of the then known varieties were freely grown by our best horticulturists.

Changed climatic conditions and the scourge of yellows practically wiped the peach trees off the face of the earth in New England thirty or more years ago, before the commercial importance of fruit growing in its present proportions had been foreseen.

For some years past we have been studying the peach and its needs for this latitude, and at the present time there is a genuine revival of peach culture, not only for the family supply, but as a commercial enterprise on many New England farms in this and other New England States.

The only reason that peaches are not grown in abundance in New England is the winter killing of the buds. In Maryland, Delaware, and other sections of the country where the trees do not suffer from winter freezing, the blossoms are sometimes forced out in the early spring and afterwards injured by frost.

A great deal depends on the intelligent selection of soils and varieties. In New England high lands are essential to peach culture. Seek a location giving as even a temperature as possible. Frost behaves much as water does, so that elevated land, dropping off suddenly, is most desirable. A well drained, naturally dry soil is best. Thorough drainage is necessary; peach trees will not grow with their feet wet. We have been growing peaches of the Persian family; also varieties from South China. Another type from North China, which we are just getting acquainted with, seems to be more hardy than the Persians. The most notable among the North China peaches is the Elberta. The Early Rivers is one of the hardiest peaches. Some think that Mr. Rivers really had a seedling of a North China peach without knowing it. The Crawford will thrive better on a clayey soil than on a sandy loam. The best soil, all things considered, is a light, sandy loam.

The peach industry tends to increase the value of land. Let ordinary farm land be developed into a peach orchard and all the land in that vicinity will immediately command $200 or $300 an acre.

The land about the average home is rich in nitrogenous matter, and peach trees planted in this soil will make rapid growth and produce splendidly for one or two crops. But such rapid growth makes soft wood, and the trees will soon die. If we want our trees

to live long and be happy we must not give them too much nitrogen. I would prefer poor soil to a very fertile one, and would feed it, but would avoid stable manure. Fertilizers rich in phosphoric acid and potash give ripe, hardy wood, and may be used freely. Potash adds to the color and quality of the peach.

For peaches prepare the soil as for any other crop with which you wish to succeed. The land cannot be ploughed too much. I recently visited the farm of General Bidwell, in Chico, Cal., a magnificent farm of forty thousand acres, cultivated with the steam plough, etc. An adjoining lot of land of five hundred acres, belonging to a lady, was ploughed with a good pair of horses and steel plough, and thoroughly harrowed, and on this land the amount of wheat raised was more than double that raised on the same area of the former farm. Plant in the spring. You cannot plant too early. Set the trees from sixteen to twenty feet apart each way. I set mine thirteen feet apart, which is too close, yet I make it pay. In one orchard I planted half the trees eighteen feet and the other half twelve feet each way, but by mistake got them only eleven and one-half feet apart. A careful account of the expense and yield has been kept. The close planted had to be fed more and pruned more, but at the end of twelve years were $7,000, net, ahead. At thirteen years the wide planted began to gain on them, reducing the balance to $5,000 or $6,000. Close planting means an everlasting pruning of trees. Medium-sized trees are the best to plant. Nurserymen charge more for large trees, but they are no better. Get trees a year old, from four to five feet high and three-fourths of an inch in diameter at the base. Don't worry if they come from the nursery without a great quantity of fibrous roots. I cut them all off smoothly from two to four inches long. Prune the top to a single stem about fifteen inches long. Don't put in any fertilizer around the tree when planting. Use nothing but fine earth; the fertilizer may be spread on top.

It is a mistake to attempt to grow crops between the trees. If you are a thorough cultivator, and crowded for room, you may plant low-growing crops. But this should be done when the orchard is young, before the trees come into bearing. I should have nothing but peaches in a peach orchard, except a horse, harrow, and plough. If your land is thin, and commercial fertilizers are insufficient, you may obtain nitrogenous matter by sowing

green crops. I sometimes use cow peas. Sow in midsummer, let them die, and plough in in the spring. Bank the trees to prevent them from swaying and to protect them from mice.

After the trees are planted rub off most of the sprouts, leaving three or four to grow at will. Prune after the weather becomes cold in the fall, and before spring growth begins. Shorten in and thin out the branches. The following spring cut out again, but don't cut off any of the little side spurs. Make a broad even tree and make it low. Continue the pruning until the tree begins to bear. With only one per cent of the buds left alive after a hard winter's freeze there is a chance for a crop. I have had a great crop with only four per cent.

Peach buds are badly killed in Massachusetts and Connecticut this winter. Out of two thousand buds I found only three alive, but by cutting from spurs I found a better proportion. If trees are badly injured by frost, wait till April, when the buds are swelling, before pruning. Leave the fruit buds wherever they are, one at the base of a branch, one at the top of another branch, etc. This makes a bad looking tree, but gives fruit, and the next year you can prune for form.

After the fruit is set in the spring, look the trees over and thin out the fruit where it is in clusters, leaving it from four to six inches apart. This means sometimes taking off nine-tenths of the fruit, but thinning is absolutely essential to the production of fine fruit. It will take only fifty or sixty of the largest-sized peaches to fill a half-bushel basket, which will sell for two dollars; of the next size, one hundred and twenty-five, selling for a dollar and a quarter; while of the small ones, two hundred will be needed, which will bring fifty cents a basket or a quarter of a cent apiece. Large peaches have more water, small ones more nutritive matter, yet the profit is all in the big ones.

When the fruit is well grown, leave it as long as possible upon the tree. If your market is reached by your own wagon, you can leave it until fully ripe before picking. It will take from seven to twelve days for all the fruit on a tree to come to maturity. Pick the fruit carefully and grade it. Never use a machine in grading. The only machine which can grade peaches well is a bright, intelligent woman. Men will lay aside extra fine specimens to put on top. Women sort them honestly; men either can't or won't. Pack honestly from top to bottom. In my Georgia orchard I have had two

hundred girls employed in sorting fruit. They work hard and get very tired before night, and as an experiment I tried putting a stringed band into the packing shed to play from two o'clock until dark, and found that it increased the work twenty-five per cent, and left the worker in a happy, contented condition.

Will peach growing be overdone? There is a chance that it might be, if all the trees planted came into bearing. But many who try peach growing do not succeed. The man who believes he can do it can. He must believe in himself. He must have a love and a taste for the business and an interest in it.

Massachusetts has some wonderful opportunities in this direction, for in central Hampshire, central and eastern Hampden, central and southern Worcester, Essex, Middlesex, and Norfolk counties, there are many tracts of lands perfectly suited to the peach, both as to soil conditions and elevation. Many of these tracts are within easy driving distance of your manufacturing towns and villages, and all of them are so situated that their choice products in a thoroughly ripe condition can be put down in any of the New England markets in from ten to twenty-four hours after being taken from the tree. It only needs men who have faith in the business and in themselves to develop these grand possibilities.

Discussion.

President Appleton asked if there was not something better than barrels for apples, to which Mr. Hale replied that he believed in boxes. In New York, a few weeks ago, he saw several car-loads of apples wrapped in paper and packed in bushel boxes.

In answer to an inquiry by William C. Strong about peach yellows, Mr. Hale said that quite a number of Massachusetts people do not recognize any such disease. It is a dangerous, deadly disease, for which there is no remedy, no cure. The infested trees should be pulled up immediately and burned. In young orchards it is well to remove the four nearest trees also, in order to prevent the spread of the disease. It is unknown in the South and in California.

Samuel H. Warren asked the lecturer if he knew of anything to protect the buds from winter killing.

Mr. Hale replied that the easiest way was to spray the trees

every very cold spell with water, which would form a coating of ice over the buds and protect them.

Mr. Warren knew of a man who had tried this and saved his orchard.

Jacob W. Manning asked whether Mr. Hale was troubled with peach rosette in Georgia. This, Mr. Hale said, seems to be dying out in the South.

Edmund Hersey knew of a variety which had never been troubled with the yellows. Trees of this variety had been growing on his farm for one hundred and fifty years. Southern trees in his neighbor's orchard had died of the yellows, yet these trees had never suffered. Three strong seedlings were budded with Crawford's Early. These grew and bore peaches for a number of years, but the Crawford part finally had the yellows and the trees were allowed to die. The branches which came from the strong roots were perfectly healthy. The peaches were not of good quality, but it never was a good variety.

George D. Moore asked for information in regard to borers.

Mr. Hale thought banking the trees early in the growing season with six or eight inches of earth the cheapest and easiest way to prevent them. But trees should be looked over once a year and the borers dug out.

In answer to an inquiry by Joshua C. Stone regarding the use of straw or burlaps as protection against freezing, Mr. Warren said that he had had experience in tying trees in burlaps and that it had done no good whatever. He had saved some trees by bending them down and covering them with snow.

Mr. Fisher asked the lecturer how high he allowed his trees to grow.

Mr. Hale replied that they should be headed so low that eighty per cent of the work of thinning, pruning, and gathering may be done on the ground. The average height of a full-grown tree should be about ten feet.

Thomas Harrison asked how to avoid splitting of the trees.

Mr. Hale said by avoiding crotches; cut off one branch. An amateur cultivator might trim trees in ideal form, but it can't be done in a commercial orchard.

Some of the indications of the yellows, Mr. Hale said in answer to an inquiry, are a premature ripening of the fruit, an unnatural size of the fruit early in the season, and a lack of natural flavor.

Also the so-called pennyroyal sprouts, with long, narrow leaves, which develop in the autumn after the leaves begin to fall. The yellows will often strike the most vigorous trees, the first symptom being a thicker clustering of the leaves. Sometimes these leaves, only half an inch apart, will be two inches wide and eight inches long, and on being held to the light will show a yellowish color not seen in the rest of the foliage.

A. M. Clement spoke of the Peach Yellows Law, which he said they have been trying for three years to secure in this State. He is anxious to see it tried as an experiment in the shore counties.

BUSINESS MEETING.

SATURDAY, February 4, 1899.

An adjourned meeting of the Society was holden at 11 o'clock today, the President in the chair.

In the absence of the Secretary, by reason of illness, the President appointed Miss C. M. Endicott Secretary *pro tem.*

Charles E. Richardson presented his Annual Report as Treasurer for the year 1898, approved by the Finance Committee. It was voted that the report be accepted without reading. On motion of William C. Strong it was voted that the Treasurer give a brief abstract of his report, showing the general condition of the financial affairs of the Society.

The Treasurer stated that the	Assets were . .	$482,721 65
	Liabilities . .	55,955 43
	Surplus . .	$426,766 22

Since the beginning of the present year the liabilities have been decreased by the payment of the Stickney Fund of $12,000 to Harvard University, agreeably to the terms of the indenture by which it was held. The liabilities have also been decreased by the payment of $1,000 remaining on the mortgage on the building.

The Society has received during the present year the specific bequest of $10,000 by the late Francis B. Hayes, and also a large part of the amount coming to it as residuary legatee under the

same will. The Society has also received $1,000 from Mrs. Jerome Jones to constitute the Henry A. Gane Memorial Fund.

The Treasurer further stated that the present membership of the Society is 738, viz.: 535 Life Members and 203 Annual Members.

Joseph H. Woodford, Chairman of the Committee appointed to prepare a Memorial of the late Charles N. Brackett, presented the following:

By the death of Charles N. Brackett this Society has lost one of its most valued members. When he passed away on the fourth day of January he had attained the age of seventy-two years, and had been an active member of this Society for forty-eight years, and Chairman of the Vegetable Committee thirty-two years. The Society has lost a faithful and unpretending servant, and a man who will be missed by his associates. There are none who over so long a period of time have in quiet faithfulness performed their duties to the Society in a more conscientious or satisfactory manner. He was very punctual, careful, and just in all the work of his Committee; very quiet and unobtrusive in his demeanor, and beloved by all who knew him.

In the death of our fellow-worker and friend, this Committee, representing our Society, desires to express to his family its deep sympathy with them in their and our loss.

JOSEPH H. WOODFORD,
VARNUM FROST, } *Committee.*
WARREN H. HEUSTIS,

The report was accepted, and it was voted that it be entered on the records, and that a copy be sent to the family of the deceased.

J. Woodward Manning moved that the Secretary prepare a card list of all awards of Medals, Certificates of Merit, Honorable Mention, and Complimentary Notices, for the last ten years, the same to be continued and kept on file, experience having proved that there is danger of making such awards a second time, which would be obviated by the existence of such a list.

This motion was carried.

Henry L. Clapp moved that the Society illustrate its TRANSACTIONS and place them on sale.

Edward O. Orpet offered as an amendment that illustrations of plants which had been thought worthy of the award of Medals or Certificates of Merit should be given.

William C. Strong thought that the Society did not want to vote that everything which received one of the above-mentioned awards should be illustrated. William H. Spooner suggested as an amendment that the illustrations should be subject to the approval of the Committee on Publication. The amendments were adopted, and Mr. Clapp's motion, as thus amended, was passed.

The following-named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

Dr. Edwin A. Daniels, of Boston.
Warren D. Hinds, of Townsend.

On recommendation of the Executive Committee, it was voted to appropriate $80 for the use of the Garden Committee for 1898, additional to the appropriation for that year. As, according to the By-Laws, appropriations of money can be made only at Stated Meetings of the Society, this matter will come up for final action at the next Stated Meeting, the first Saturday in April.

Adjourned to Saturday, March 4.

MEETING FOR LECTURE AND DISCUSSION.

Saturday, February 11, 1899.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, Francis H. Appleton, in the chair. The following lecture was delivered:

Injurious Insects and their Transformations.

By Prof. Clarence M. Weed, New Hampshire College Agricultural Experiment Station, Durham, N.H.

None of the evil effects of the changes which modern civilization has made upon the earth is more evident to the American farmer than the increased difficulty of saving his crops from the ravages of noxious insects and parasitic fungi. Many of us

have heard from our fathers and grandfathers of the apples which once grew in abundance in yards and along highways, strangers alike to the codling moth, maggot, or scab; of the luscious peaches free from worms and rot; the plums unmarked by the curculio, and the pears that had yet to learn the secret of becoming dwarfed, gnarly, and cracked; of the grapes that knew not how to rot; and the potatoes which had neither been blighted nor bitten by the Colorado beetle. Now all is changed: every crop has foes that often gather the lion's share of the harvest. The enemies have come from the north and the south, the east and the west, from Europe and the islands of the sea, and in our own midst they have flocked from the forest to the field, deserting a wild plant for its cultivated congener, or changing their habits to conform to a new environment.

This increase of noxious insects, however, is the natural result of the changed conditions of things. Among the principal factors tending toward it may be mentioned: (1) the massing of crops in limited areas; (2) the facilities for transporting insects long distances by vessels and railways carrying agricultural products; (3) the abandoned farms and orchards that serve as breeding grounds; (4) the destruction of forests and the cultivation of prairies; and (5) the decrease in the numbers of insectivorous birds.

Considering each of these factors briefly, we find that the tendency of the first — that of the massing of crops in limited areas — toward increasing our insect pests rests upon the biological law that the increase of any animal is limited by its food-supply. Under the natural conditions existing on this continent before the advent of the white man, those insects which fed on wild plants had, as a rule, only a limited food-supply. The apple maggot, or railroad worm, for example, is supposed to have bred originally in the wild haws of the woods. The parent flies had then usually to find here and there an isolated tree bearing the fruit in which it deposited its eggs. Its chances of being caught by a bird or entrapped in a spider's web while on this search were very good, so that the scarcity of the food-supply not only directly limited the number of individuals that could be produced, but by being scattered it increased the chances of the adult insects falling a prey to enemies. But in a modern apple orchard all this is changed: the food-supply is almost unlimited, and is so massed together that the insect runs little risk in passing from fruit to fruit, or from

tree to tree. Hence it can multiply indefinitely, unless there is some means of checking it. The same line of reasoning applies to a large proportion of our injurious insects.

We are indebted to our commerce on sea and land for many of the most noxious insects. Brought to our shores from Europe, Asia, or Australia by ships, many of these pests have found a land which for them was flowing with milk and honey, and in which their hereditary enemies had not yet gained a foothold. Consequently they have multiplied without let or hindrance; and by natural and artificial means — notably the railroad trains — they have rapidly overrun the country of their adoption.

The abandoned or neglected fields and orchards all over the United States have proven a prolific breeding ground for many insect pests. Too often the efforts of painstaking farmers have been rendered unavailing by the proximity of such sources of infection. An orchard that has outlived its usefulness had better be converted into firewood than left to die uncared for.

The destruction of forests has compelled certain insects to resort to cultivated crops for subsistence; and in some cases a decided change in feeding habits has resulted. So, also, the bringing of the prairies into cultivation has caused many insects which originally fed upon wild grasses to resort to pastures and meadow lands.

The fact seems well established that birds, as a class, are now less numerous in the United States than they were a century or more ago. While some species have doubtless become more abundant under the changed conditions of modern civilization, others are very much rarer and a few appear to be approaching extinction. It of course was inevitable that the changes produced by man's interference with natural conditions should exert a tremendous influence upon the native fauna: some birds have found the new dispensation better suited to their wants than the old; others have changed their habits and made the best of it; while others have been so relentlessly persecuted that their only hope of survival lay in retreating to inaccessible swamps or cliffs. The wholesale destruction of primeval nesting sites has been a potent factor in the change produced, but fortunately many of the most useful birds have found substitutes that answer the purpose very well: the swallows have gone from hollow trees to the eaves and rafters of barns, and the swifts from trees to chimneys. The

great increase of meadow land has encouraged the development and distribution of birds like the meadow lark, originally confined to the prairies, while the decrease of forests has tended to the suppression of species like the passenger pigeon that lived largely on acorns, beech nuts, and other forest products.

Without stopping for further consideration of the causes of this decrease let us see what effect it seems to have had upon the hordes of noxious insects. It has been repeatedly shown that the birds are one of the most effective natural means of regulating the increase of insects. They have well been likened to a great standing army which of its own volition concentrates itself wherever an insect outbreak is threatened. We are not likely to overestimate the services of these feathered allies. Whenever an investigation of their relations to noxious insects is made we have new proof of their beneficence. Only recently in a study of the food of the chickadee in New Hampshire I was astonished to find that one of these birds frequently devours between four and five hundred plant-lice eggs in a single day, so that during the long winter months which these chickadees spend so cheerfully with us, millions of the eggs of these destructive pests must be devoured. The present crusade in favor of the birds is one in which the horticulturist is vitally interested.

The operation of these various causes, together with the enormous powers of multiplication possessed by the insects themselves, has led to a constantly increasing injury to cultivated crops, until today these tiny foes exact a tribute of ten per cent of the crop products of American agriculture. They form an omnipresent host of tax-gatherers, taking possession of the farmer's crops and enforcing their onerous demands without process of law, unless preventive measures are vigorously prosecuted. They are no respecters of persons; like the rain, they fall upon the fields of both the just and the unjust.

"The authorities best able to judge have estimated the annual loss in the United States due to these little pests at nearly half a billion dollars. Noxious insects, according to Dr. C. V. Riley, recently the distinguished entomologist of our National Department of Agriculture, occasion losses in the United States which are 'in the aggregate enormous, and have been variously estimated at from $300,000,000 to $400,000,000 annually.' In single States and single seasons the loss is often frightful in extent.

During some of the great chinch-bug epidemics the loss in Illinois occasioned by this one insect has amounted to over $73,000,000 a year; and in seasons not marked by an outbreak of such a great crop pest the injury is much more severe than is ordinarily supposed. The official entomologist of the State just named, Prof. S. A. Forbes, after years of careful field observation and statistical study, has recently expressed his belief that 'the insects of the State of Illinois derive as large a profit from the agriculture of this great agricultural State as do the farmers themselves.'"[1]

Fortunately, however, there is an extended silver lining to this dark cloud of insect injury. If these creatures have increased on every hand, our knowledge of methods of controlling them has also augmented with the passing years. Many of the remedies proposed ten or twenty years ago seem now foolish and impracticable. Within the last decade especially the progress has been phenomenal. It has been shown that many insects can be checkmated by a proper crop rotation; that the natural enemies of others can sometimes be used to destroy them; and that others are easily killed by improved insecticides. But the most important advance has been the introduction of the spraying machine, an apparatus by means of which insect-killing substances may be easily and rapidly distributed over the surfaces of trees, shrubs, vines, and herbaceous plants. As I have elsewhere said, its introduction into American horticulture marks an advance almost as important as was marked by the advent of the improved cultivators into our agriculture. Before the latter were introduced the weeds that infest the soil were fought by the hand hoe, but now a single team does the work of many men. In the same way until recently various laborious and partially effective methods were used in fighting noxious insects and destructive fungi; but now many foes of both these classes are fought on a large scale by the force-pump and spray nozzle, and every season adds others to the list of those against which this method may be successfully used. With a large class of farmers and fruit growers, spraying has become a recognized part of the season's operations, and therein lies the chief promise of the method. When the belief becomes general that it is as important to save a crop from destruction by its foes as it is to produce it; that fighting noxious worms must take its

[1] C. M. Weed, "Popular Science Monthly," March, 1893.

place as a farm process by the side of that of fighting noxious weeds; that the parasitic plants which absorb the vitality of leaf and fruit are as dangerous to the crop as the plants which dispute with it the possession of the soil; and when along with this recognition there is placed before the farming community a cheap and wholesale method of preventing the injuries of these organisms — then the vast annual loss now suffered because of insects and fungi will be very greatly lessened.

Transformations. — It is frequently supposed that almost any sort of bug, worm, or spider that flies or crawls about is an insect, but strictly speaking, a large proportion of these creatures are not insects at all. For example, a spider is not an insect; neither are the thousand-legged worms so often found under boards. In both these cases the creatures have too many legs to belong to the insect class. Spiders have eight legs and the thousand legs a great many more, while the true insects have but six. The body of an insect is also divided into three principal regions — head, thorax, and abdomen. A majority of them are also characterized by undergoing during their development a series of well-marked changes or transformations. Such insects exist in four distinct stages; namely, 1, the egg; 2, the larva or caterpillar; 3, the pupa or chrysalis; 4, the adult or imago. We may take, for example, the common cabbage worm: the white butterfly deposits, singly or in clusters of two or three each, small yellowish eggs upon the cabbage leaf. These soon hatch into little green larvæ that feed upon the substance of the foliage; in about two weeks they become full grown, when they generally leave the cabbage plant, and, finding some suitable shelter, — beneath a board or under the coping of a fence — change to chrysalids. They remain in this condition about ten days, when they emerge as butterflies.

An insect which goes through so distinct a series of changes as this is said to have complete transformations, to distinguish it from those having incomplete transformations. For example, our common grasshoppers hatch in spring from eggs deposited in the ground the previous season. The newly hatched grasshoppers resemble the adults in general appearance, but are smaller, and have no wings. They gradually increase in size, and moult, or shed their skins, at frequent intervals. They continue active until they become full grown, having no quiet pupa or chrysalis state. Such insects are said to undergo incomplete transformations.

While, in general, insect transformations may be grouped under these two headings, complete and incomplete, there are many modifications of each of the methods. One of the most interesting of these is illustrated by the aphides or plant lice — the green flies of the gardener and florist. The life-history of these little creatures may be summarized as follows: In the spring there hatches from an egg deposited the autumn previous a little aphid that sucks the sap of the food plant for a number of days — sometimes a fortnight — before it becomes full grown. During this period of growth it moults, or sheds its skin, a number of times to provide for its rapidly increasing size. This insect is sometimes called the stem-mother: she is always wingless. Soon after reaching maturity she commences to give birth to living young, continuing the process usually for several days. The young mature in the course of ten days or two weeks, when they begin to give birth to a third generation, and so the process is repeated again and again, the insects multiplying with marvellous rapidity. All of these aphides are the so-called agamic or viviparous females, giving birth to living young without the presence of any males. Throughout summer this is the only method of reproduction, but on the approach of cold weather a true sexual generation is produced. Eggs are laid by these, being deposited on the twigs of trees or the leaves of herbaceous plants, where they remain throughout the winter.

Insects take their food in two ways: some insects bite, others suck. The former, of which the Colorado Potato Beetle is an example, are provided with jaws by which they can gnaw the surface of the food-plant. The latter have, instead, a pointed, tube-like beak which they can insert into the tissues of their host-plant, and suck out the sap.

On account of this difference in feeding habits some insects can be destroyed by coating their food-plants with poison, the beetle just mentioned, for example, while others, like the plant lice or the Chinch Bug, must be treated with some insecticide that kills by contact.

Injurious insects have many natural enemies to contend with. Among the larger animals, they are preyed upon by the "fowl of the air and the fish of the sea;" frogs lick them up with their viscid tongues, and toads are continually sending them in search of the mystic jewel within their bodies; while snakes, lizards,

moles, skunks, and a host of other animals are their constant enemies. But more destructive than any or all of these are the foes of their own class — the predaceous and parasitic insects.

Predaceous insects are those which attack other insects from the outside, devouring them bodily or sucking out their lifeblood. The handsome little lady-bird beetles, the two-winged robber-flies, or the four-winged dragon-flies furnish good examples of this class. So, also, do the black ground beetles, found everywhere under sticks and stones. Some of the largest of these are called caterpillar hunters, because they feed upon canker-worms, army-worms, cut-worms, and various other insect pests. Other predaceous insects live in ponds, lakes, and rivers, devouring mosquitoes and related creatures, while still others burrow through the earth, and devour the insects found therein.

The common dragon-flies or devil's needles are good examples of predaceous insects. The adult dragon-flies lay eggs upon the stems of plants growing in ponds and streams. The eggs soon hatch into small larvæ that live in the water upon young mosquitoes and other aquatic insects. In about a year the larva becomes full grown; it then crawls up out through the water, the skin splits open along the back and the adult dragon-fly appears. It rests awhile to expand its wings and then flies rapidly through the air, in search of winged insects of almost any sort. In "The Two Voices" Tennyson has described the final development thus:

> "To-day I saw the dragon-fly
> Come from the wells where he did lie.
>
> "An inner impulse rent the veil
> Of his old husk: from head to tail
> Came out clear plates of sapphire mail.
>
> "He dried his wings: like gauze they grew:
> Thro' crofts and pastures wet with dew,
> A living flash of light he flew."

Parasitic insects differ from their predaceous cousins in that they develop within the bodies of their victims and thus destroy them. These, also, are exceedingly numerous, both in individuals and species. A good illustration of the habits of this class is found in the small, four-winged black fly that destroys the common Grape Caterpillar, an insect closely related to the

familiar Tomato Worm or Tobacco Worm. This fly deposits a number of eggs beneath the skin of the caterpillar, and these eggs soon hatch into minute worms or maggots that absorb the body juices of the worm and develop at his expense. After a few weeks these maggots become full grown, and burrow their way out through the skin of their hapless and helpless host. They then spin their white and silken cocoons upon his back. Within these cocoons they change to the pupa or chrysalis state. About two weeks later they again change, and the legless little maggots find themselves transformed into neat and pretty black flies, with four wings and six legs, like the one which a few weeks before deposited in the caterpillar the eggs from which they developed.

But these parasites are not always so successful as this, for they frequently furnish a striking illustration of Dean Swift's oft-quoted couplet:

> "So, Naturalists observe, a flea
> Has other fleas that on him prey;
> And these have smaller still to bite 'em;
> And so proceed ad infinitum."

These parasites are frequently subject to the attack of a still smaller parasite which destroys them as they destroyed their host. In such cases the first-mentioned species is called the primary parasite and the other a secondary parasite.

It is the presence of these secondary and other parasites that makes the subject of injurious insects and their enemies extremely complicated. For example, in New Hampshire we have been studying for several years the life-history and enemies of the common American tent caterpillar — the pest which for so many seasons has pitched its unsightly tents in the orchards and along the highways of New England. Doubtless to most of you the general life-history of this insect is well known. You know that in winter it exists in the egg state — the masses of a hundred or more being fastened around the twigs of apple and wild cherry trees. In the spring the little caterpillars emerge from the eggs and begin feeding upon the tender foliage of the buds about them. In a few days they begin to make a silken tent, utilizing generally, for this purpose, a fork of the branch. As time goes on the nest is enlarged. The caterpillars retire to the tent at night, and during cold and wet weather, and when not feeding. They have

regular times for meals, leaving and returning to the nest in processions. They become full grown in about six weeks, being extremely voracious during the latter part of their development. They are nearly two inches long, with a hairy body ornamented with a distinct white stripe along the middle of the back, on each side of which are numerous short, yellow, longitudinal lines, rather irregularly arranged.

Most of the caterpillars leave the tree where their nest is as fast as they are full grown, and crawl about in search of a suitable shelter to pupate in. Having found this, — beneath a board or in the cracks of a fence, — they spin an oval, silken cocoon, yellow when completed, within which they change to the pupa or chrysalis state. In two or three weeks another change takes place, and from the cocoons come forth reddish-brown moths. The female moths soon deposit the clusters of eggs on the twigs of trees, after doing which they die. Thus there is but one brood each season.

Now we have bred more than twenty species of parasites which prey directly or indirectly upon this tent caterpillar. One of these is so tiny that its development takes place within the egg, and so it is called an egg parasite. Most of the others prey upon the caterpillars themselves. Perhaps the commonest species is a four-winged fly belonging to the genus Pimpla that deposits its eggs in the caterpillars when they are nearly full grown. These eggs hatch into little grubs, each of which absorbs the juices of the host, developing at its expense, but not killing it until after it has spun its cocoon. Then the parasite matures rapidly, changes to a pupa, and soon after emerges as a four-winged fly.

This parasite, however, is commonly checked in its career by another. A four-winged fly of a different species from the one which laid the egg for the primary parasite lays an egg beside or upon the parasite grub. This egg hatches into a tiny larva that attaches itself to parasite No. 1, and begins slowly to absorb its lifeblood. Parasite No. 1 is unable to shake off parasite No. 2 and soon gives up his life to it. No. 2 feasts upon the carcass of its victim and rapidly becomes full grown, when it changes to a pupa, to change again soon after into a fly.

But a third fly, called Dibrachys, often comes upon the tragic scene. When the larva of parasite No. 2 is approaching full growth the Dibrachys fly deposits beside or upon it an egg. The

egg soon hatches into a minute larva that fastens itself to parasite No. 2, and soon kills it. Then this parasite No. 3 feeds upon the body of No. 2, as No. 2 had fed upon No. 1, and No. 1 had fed upon the tent caterpillar. In due time No. 3 becomes full grown, changes to a fly, and wanders off in search of other victims.

These shifting scenes of tragedy have all taken place within the small yellow cocoon of the caterpillar. The cocoon, perchance, is fastened to the tough bark of a tree or the boards of a fence. Along comes a bird, — a chickadee or a sparrow, — spies the yellow silk, and, knowing that there is a luscious insect morsel inside, pecks open the cocoon and devours the contents. Now from our human point of view, of which, of course, none of these creatures is conscious, does the bird do us a benefit or an injury? It may be that the bird simply eats a caterpillar that had no parasite, in which case we should conclude that it was befriending us; it may be that it ate instead parasite No. 1, cutting off the hope of progeny of a host of friendly insects, in which case we should be likely to conclude that it was doing us an injury; possibly the bird comes when parasite No. 2 is getting in its work, when again we should conclude that it was a friend; or finally should it reach the cocoon when parasite No. 3 was present the same reasoning would lead to the conclusion that again the act was unfriendly. But the arrangements by which the increase and decrease of injurious insects are brought about are so intricate that after fifteen years' consideration of the subject I am convinced that we cannot safely say that the bird which devours the secondary parasite of a noxious insect is doing an unfriendly act. What we call the "Balance of Nature" is so delicately adjusted that the only safe thing for man to do is to act cautiously and with the fullest possible knowledge.

Now this sketch of the parasites which beset the tent caterpillar is no fanciful one. And could we but study with equal thoroughness our other injurious insects I doubt not that similar conditions would be found. In fact, in several cases such studies have been made, and very similar results obtained.

Insect enemies and birds, however, are only a part of the agencies which work for the woe of the tent caterpillars. During the summer of 1897 in southern New Hampshire these various parasites were so abundant that a large percentage of the caterpillars were destroyed before maturing into moths, yet enough of the latter developed to provide eggs for a vast number of colonies for the

brood of 1898. But during 1898 in my region the pests were checked much more effectively, and by entirely different agencies. Just after the larvæ had hatched last April a heavy and long-continued rainfall caused the death of enormous numbers of them. An examination of the apple and wild cherry trees after the storm showed that in most cases the only larvæ present were those huddled together on the lower side of the egg mass, where they were protected from the washing effect of the rain. These survivors developed in sufficient numbers to be decidedly in evidence in May, but they had to succumb to a very great extent during the last weeks of their growth to a bacterial disease — a sort of insect cholera — that killed them in vast numbers. The effectiveness of this disease was doubtless increased by the wet weather prevailing at that time. Early in June nearly every nest was full of dead and dying caterpillars, many of those on the outside of the web gradually shrivelling up until only the dried skins remained. A series of observations made upon a large number of nests just before the time for pupation showed that more than ninety per cent had been killed by this disease. As a result there were few of the caterpillars crawling about the streets and highways in early June, although during previous years great numbers were to be seen at that time. There were also comparatively few moths later in the season, and the eggs now to be found are correspondingly reduced.

But what was the effect of this epidemic of disease upon the parasite? It was almost as destructive to them as to the caterpillars. While some of the parasitic flies probably found other species in which to deposit their eggs, it seems to have been inevitable that vast numbers of them must have perished with their hosts. In consequence it seems likely that in the region under my observation the outbreak of the American tent caterpillar which has extended over at least the last five years has been checked, and that the coming season the pests, having swung to a point in which their numbers are far below the average, will begin again the gradual increase that shall lead to another culmination some years hence. And it is worthy of note that they begin this increase at a time when their parasites are, comparatively speaking, very scarce, so that for several years the caterpillars will suffer little from their attacks.

I have dwelt thus upon the relation of the tent caterpillar to its parasites because there is an impression abroad that the modern

way of fighting noxious insects is by means of their insect enemies. The famous lady bird introduced into California a few years ago to destroy a scale insect is responsible for much of this opinion. But this remarkable case was the exception which proves the rule, that in general it is not practicable to fight injurious insects by means of enemies of their own class. In the California case the conditions were unique, and a great deal too much weight has been given to it.

It is fortunate that this American tent caterpillar is restricted in its food to comparatively a few kinds of trees. Were it a more general feeder these periodical outbreaks would be matters of much more serious concern than they now are. An illustration of this fact is seen in the history of the closely related Forest Tent Caterpillar (*Clisiocampa disstria*), which feeds upon a much greater variety of fruit and shade trees. In its life-history it is very similar to the common species; it is a native American insect and is beset by hosts of enemies, yet during the last century there have been frequent and destructive outbreaks of it in many parts of the United States. In Maine, New Hampshire, and Vermont during the last few years such an outbreak has been taking place. Last season immense damage was done over large areas of forest growth, the woods in July looking as bare of foliage as they do now. There are millions of eggs now upon the trees, with every prospect that the coming season the attack will reach a severity much greater than that of 1898. Before such hordes of caterpillars the efforts of individual men seem futile. It is possible to fight insects in orchard trees and on the home grounds, but when the wilderness is alive with crawling foes what can man do but hope for a speedy culmination of the outbreak? But we know from long experience, not only with this but with many other insects, that the outbreak will be ended by natural causes only after the passing of several seasons in which great damage has been done.

This Forest Tent Caterpillar perhaps better than any other illustrates what would happen if the people of Massachusetts should permit the Gypsy Moth to escape from its present boundaries and become a scourge to the agriculture of the United States. This forest caterpillar is a native insect: for untold ages other American insects have been learning to prey upon it, but notwithstanding this the caterpillar at frequent intervals becomes so abundant as to do immense damage over large areas. There is

every reason to believe that the gypsy caterpillar, even if we imported every species of parasite to be found upon it in Europe, would be vastly more destructive. Its range of food-plants is much greater, especially so in its habit of attacking coniferous trees; it is a hardier species; it is not so freely eaten by birds; and it has that peculiar but undoubted advantage which the alien insect, sparrow, or rabbit enjoys over the native inhabitant. The argument so often heard that the gypsy moth can safely be left to the mercy of its parasites is discredited by the experience of every economic entomologist in the land. Any one who believes the argument to be sound would do well to visit, next June, the regions infested by this forest caterpillar.

The methods of preventing insect injuries may be conveniently grouped together under four headings; namely, 1. Agricultural methods; 2. Mechanical methods; 3. Use of natural enemies; 4. Insecticidal methods.

The limitations of the use of natural enemies have already been discussed, and there is only time now for a brief mention of the more important measures under the first and second of these headings.

[The speaker here gave a short discussion of clean culture, crop rotation, fall ploughing, fallowing, fertilizing, modifying the time of planting, hand-picking, excluding by mechanical means, attracting to light, and various other measures.]

Lack of time forbids a discussion of the various insecticidal methods of destroying injurious insects. I have already said that the most important recent advance in these methods has been the introduction of the spraying machine, and I would now add that the most important advance in the use of spraying machinery has been made by the Gypsy Moth Commission here in Massachusetts, in perfecting both the material to apply and the machinery with which to apply it.

Spraying is simply an easy and practical method of distributing certain substances having a destructive effect upon insect and fungous life over the outer surfaces of trees, shrubs, vines, and herbaceous plants. These substances are usually applied in a finely powdered condition, and the tiny particles stand guard over the plants, killing with remorseless certainty any insect or fungous pest that attempts to pass through their lines to reach the plant. As a rule the particles themselves do not enter the plant, but re-

main on the outside until driven off by the combined action of wind, rain, dew, and sunshine. This is not true, however, of the contact-killing insecticides, which are applied directly to the offending insects, and do not remain on the plant in an effective condition.

In conclusion, let me say that in view of the progress made in the past twenty-five years in our knowledge of injurious insects and the methods of preventing their injuries, we may well be sanguine concerning the future. But the experience of the present decade has shown us as never before that these pests must be reckoned with in the plans of the individual, the State, and the Nation. There are hosts of foes that have not yet invaded our country which we are likely to be called upon to fight, unless rigid measures of exclusion are put in force. It behooves every man interested in horticulture to be on the lookout for insects new and strange, especially on plants from abroad, and to take no chance that can be avoided of introducing one of these insidious foes.

Discussion.

Benjamin P. Ware spoke of the lecture as intensely interesting and instructive, and said that we have learned many ways of protecting ourselves. He had on his land a waste place covered with choke-cherry trees, which had been infested with the tent caterpillar, and he had felt obliged to go over the trees and destroy them. This, he said, is a very simple matter. When they are first hatched go out in the morning when the sun is shining and you can see them all, and easily destroy them. Mr. Ware appealed to the ladies not to wear birds on their bonnets. Birds, he said, are growing scarcer and scarcer. A single dealer in one year imported forty thousand humming birds to decorate bonnets. He presented spraying as the great remedy for injurious insects. The idea of spraying, he said, originated in Essex County; it was first discussed at a Farmers' Institute in Topsfield, and afterwards at a meeting of this Society. Mr. Ware moved that a vote of thanks be presented to the lecturer.

Professor Weed knew of another way in which caterpillars had been exterminated. In a town in New Hampshire the Village Improvement Society offered the children ten cents a hundred for destroying the caterpillar egg-masses. Eight dollars and twenty-

five cents in all was spent, one boy receiving $2. Thousands and thousands were destroyed in this way, and the town was practically freed from them.

Varnum Frost asked the lecturer whether he thought there was any occasion for alarm at present concerning injurious insects. He thought the tent caterpillars need cause no anxiety, for they are so easy to destroy. A weak solution of Paris green — one pound to two hundred gallons of water — will clean them all off.

Professor Weed considered spraying the most effective way of killing them. Caterpillars do not commit suicide; they are sometimes destroyed by a bacterial disease, but usually not until after a great deal of damage has been done. The idea that their natural enemies will destroy them before much mischief is done is wrong. There is an outbreak of the army worm about every ten years. The chinch bug appears about every thirteen years, and is liable to disappear suddenly.

Mr. Frost had had experience with the tent caterpillar for sixty years, and had twice known it to become so numerous that farmers got discouraged and gave up trying to exterminate it. It had appeared in such vast numbers that all foliage was soon devoured, and, its food being gone, it actually starved. He believed that the canker worm would exterminate itself, and that the gypsy moth would do the same.

Hon. Aaron Low had also twice during his life noticed that the tent caterpillar will, when it becomes very numerous, actually starve. He had a field of oats attacked by army worms, which soon became so numerous that he could hear them eating in the night. Trenches were ploughed and ditches dug across the fields, and here he could have gathered bushels of the worms. He afterwards had a good crop of Hungarian grass where the army worm had been so destructive. At the first appearance of the worm the grass was mowed, but before he could get it into the barn it was eaten to shreds. He had supposed they would come again the next year, but had seen none since.

A gentleman who was a member of the Newton Improvement Society thought it was useless to have the school children destroy the caterpillar nests. After they had destroyed many thousands, enough were left to do damage. Then, when the caterpillar had disappeared, the credit was given to destroying the nests, but not one in ten was destroyed.

Thomas Harrison said that a year ago two of his neighbors had sowed barley for green crops. When two or three feet high it was attacked by the army worm. This year they changed the crop to corn and rye, and the army worm had not shown itself. Sometimes a change of crops brings the army worm with it.

In answer to an inquiry Professor Weed said that the worm could not possibly be in the seed. It will develop in grass land, and when grown will seek grain fields, even crossing a road to get food that it likes.

The vote of thanks to the lecturer was unanimously passed.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 18, 1899.

A meeting for Lecture and Discussion was holden at eleven o'clock today, the President, FRANCIS H. APPLETON, in the chair.

The following lecture was delivered:

WHY CROPS MUST HAVE NITROGEN AND HOW IT CAN BE PROVIDED.

By Prof. G. C. CALDWELL, Cornell University, Ithaca, N.Y.

That all vegetation must have available nitrogen food is an established fact. The plant cannot grow without nitrogen. Again and again has the experiment been tried of planting the seed in an artificially prepared soil, usually clean sand, to which all the necessary foods of the plant were added except the nitrogen; every one of these experiments has given the same result: the seedling has grown for a short time only, while making use of the small quantity of nitrogen in chemical combination in the seed, — such nitrogen compounds as are stored up in every seed for the nourishment of the young plantlet till its roots can take food from the soil.

It is not long before the little plant begins to show most plainly that there is something seriously wrong in the soil; the lower and older leaves take on a yellowish color; a few new leaves may appear higher up on the stalk, that draw a part of their food from the older leaves; but they are miserably poor leaves at the best,

and they soon stop growing. It is in this way that the plant informs us that it is suffering from nitrogen hunger. This result never fails to appear, sooner or later, no matter what kind of a plant is put to the test. Such is the simple proof that nitrogen in the form of some chemical compound is an absolutely necessary component of the food of plants.

As to the use that is made of this nitrogen. We know only that it is worked up somewhere in the cells of the plant into chemical compounds that are exceedingly complex in their composition, and which play a very important part in the production of the substance of the plant, and therefore in its growth. The white of the egg, so familiar to everybody, is just such a kind of a compound as are those that are made in the plant cells, and for the making of which the nitrogen, as well as other foods, is absolutely necessary. The white of the egg is called albumen; these other compounds of the same kind that are made by the plant are called albuminoids, because they are like the albumen.

According to the opinion of chemists, these albuminoids are very closely connected with the power of motion in living beings. Animals have the power of motion, while plants have such power only in comparatively few cases. The bodies of animals are made almost entirely of albuminoids; plants, on the other hand, contain very much less; hence it is inferred that a large proportion of albuminoids in the living being goes with the power of motion which that being possesses.

But even though a plant cannot as a general rule move any of its parts, yet there is a kind of motion that goes on *in* the plant which seems to support this idea that power of motion is dependent on the coöperation of albuminoids. This motion is seen in the contents of the cells of the young and active leaves. These cells contain, first of all, water; in this water is a yellowish, semi-fluid substance which has about the consistency of the mucilage that we use for sticking things together; this part of the cell-contents is called the protoplasm; it consists largely of albuminoids; in it the microscope reveals the presence of a multitude of minute grains. In young cells the protoplasm is in constant motion, and the exceedingly small grains are themselves moving in currents through the protoplasm. Here, then, we have motion; motion in a substance rich in albuminoids; and this motion is in some way closely associated with the life of these cells.

The crops must, therefore, have nitrogen food in order that albuminoids may be produced; they must have albuminoids in order that they may grow; and these albuminoids must be in the young, active cells in abundance, in order that the growth shall be vigorous and healthy, and that the crops shall be large and profitable. We must raise crops that have albuminoids in order that our cattle and we ourselves can live. The animal cannot make albuminoids; it must get its whole supply from the grass, hay, grain, etc., that it eats, or by chewing up some other animal which got its nitrogen from the plants that it ate. We human beings are just as dependent on plants for our albuminoids as is the lowest grade of an animal; we can make thousands of chemical compounds in our laboratories, but we cannot make the minutest particle of an albuminoid.

The leaves with their millions of microscopic cells are the laboratories in which the albuminoids are made, out of carbon from the carbonic acid that is in the air, with the hydrogen and oxygen from the water that the plant is always taking up from the soil, the sulphur, perhaps, from some plaster that may be in the soil, and, finally, the nitrogen which it usually finds in the fertilizers that we apply.

A part if not all of the process of making plant substance requires the coöperation of the sun's rays. With plenty of food and sunlight and water provided, business is brisk on every bright, warm day, in these myriads of laboratories; sugar, starch, and such like things are made first, and then the albuminoids. Very little do we realize the magnitude of the work that is being carried on all around us, as we follow our cultivators through our corn or garden truck, or as we look over our fields of grain and smile at the prospect of thirty bushels of wheat or fifty bushels of oats, or as we sniff the fragrance of eight hundred bushels of onions per acre. We may say to ourselves that it is all the result of *our* labor; but the sun, the air, the soil, and the leaves are doing the biggest part of the work by far.

The possible and available sources of nitrogen are, first and foremost, the soil; second, the manures and fertilizers upon which we place so much dependence; and third, the air. As to the first source, few persons know how much nitrogen in chemical combination is contained in every soil of fair quality; the stock is immense in some cases. Lawes and Gilbert, of England, found in

the arable soils of their own fields from 3,255 to 8,645 pounds of nitrogen per acre in the uppermost two or three feet, and therefore within reach of the plant; in various other soils of Great Britain from 3,500 to 7,700 pounds per acre of area; in the prairie soils of the United States from 6,650 to 21,700 pounds; in the soils of the Manitoba prairies 16,000 to 42,000 pounds within a depth of four feet; in the soil of an English pasture 10,000 to 11,000 pounds.

Let us compare these great stores of nitrogen, quantities so large that they can be measured by tons as well as by pounds, with the quantities that are carried from our soils in the crops. The figures are, for an acre of wheat 48 pounds; 121 pounds in a good crop of corn including the stalks; 47 pounds in a fair crop of potatoes; 130 pounds in a crop of beets; 49 pounds in a crop of hay. It would seem that we need not concern ourselves about the supply of nitrogen food for our crops, with so much already in the soil, and so little carried off each year. Yet we do know that we must concern ourselves about this matter; we do know that if we let the nitrogen in the manure piles go to waste, or if we leave out the nitrogen in the fertilizers that we buy, our farming operations will not be profitable.

If it be asked why all this nitrogen in the soil seems to be of so small account, the answer is that it is in compounds that are not easily dissolved by the water in the soil, and very slowly becomes available for plant food; only as the nitrogen passes into other combinations that are soluble in water, or in the sap in the roots of the plants, can the plants get any good out of it. If one can establish a good system of drainage of the soil, and can till it frequently during the growing season, thus conserving the moisture and keeping the ground porous, so that the air can have free admission, good crops can be obtained for a series of years without putting any nitrogen fertilizer on the soil. The effect of such treatment is at least in part to convert some of the unavailable because insoluble nitrogen compounds into available because soluble compounds.

It was by this kind of treatment, and this alone, no fertilizer being applied, that an English farmer some years ago cropped a piece of ground with wheat for twelve years, getting on plots of half an acre as much wheat as was harvested from a whole acre of good soil treated in the ordinary way by good farmers. It was by a similar course of treatment of the soil that Professor

Roberts at Cornell obtained two successive crops of potatoes, yielding in the first year 367 bushels and in the second year on another plat 343 bushels; the soil was only a fair one at the start, and it received no fertilizers at the beginning of the experiment.

Nitrogen in purchased fertilizers costs nearly three times as much as phosphoric acid, if it is bought in that compound which is in general the best nitrogen food, namely, nitrate of soda. For intensive agriculture or horticulture the home supply of nitrogen in the manure of the yard is usually insufficient, and the supply must be increased in some way. The frequent tillage of the soil many times during the growing season may not be practicable as a general thing, no matter how much may be gained by it.

Is there, then, any other way by which we can get a sufficient supply of nitrogen in an available condition at less cost than by buying nitrate of soda, or with less labor than is involved in the tillage method? That our leguminous crops, such as clover, peas, beans, vetch, lucerne, and lupine may be used to help us is undoubtedly known to many in my audience, if not to all. I trust, however, that I may be able, while calling to mind again much that you have already heard and read about this subject, to give you some new information, and by means of the illustrations that will be shown with the lantern to make a more lasting impression than I can by merely talking to you about it.

It was first observed as far back as 1615 that there are peculiar swellings on the roots of certain kinds of plants; little attention was paid to them; they were supposed by some to be simply parasites living on the juices of the plants on which they were growing; others supposed them to be the results of the attacks of some insects; and others still thought that they might be the beginning of new roots. Not till 1858 was any further attention paid to them; then a German botanist found that they contained bacteria or microbes — those smallest of living microscopic organisms; he suggested the possibility that these swellings, or tubercles as they are more commonly called, stand in such relations to the plant on whose roots they are established, and especially to leguminous plants, as to account for the common opinion of farmers that such plants can take up and assimilate the free, uncombined nitrogen of the air.

In 1887 two German agricultural chemists performed some very interesting experiments which showed most conclusively that these

tubercles really do in some way enable the plants bearing them to take nitrogen from the air and make use of it as they would nitrogen from any other source. In 178 pots they put soil consisting of pure sand with no nitrogen in it, but to which all other foods that the plant required were added; there were planted in these pots oats, buckwheat, rape, — a plant then much cultivated in Germany for its oil, — peas, seradella, — a forage crop, — and lupine; only one seed was planted in each pot. The seeds germinated in all the pots alike, and all the plants grew alike up to a certain point, or as far as they could grow with the aid of the nitrogen in the seed; then the growth stopped in all the pots, and soon the yellowish color indicating nitrogen hunger appeared. An extract of garden soil was then made by simply stirring it up with water, and letting the coarser particles settle to the bottom of the vessel; a very small quantity of this extract was then added to the soil of each of the pots.

The oats, buckwheat, and rape remained in the same state of nitrogen hunger, making no further growth. The peas, seradella, and lupine, after a little time, as if waiting to consider the matter, suddenly recovered their normal green color, and from that time on continued to grow luxuriantly till they were ripe. If some of the extract was first boiled before applying it to the soil, all the plants so treated remained in the condition of nitrogen hunger, whether they were leguminous plants or not. The boiling of the extract could produce no other important change in the liquid than to kill bacteria in it. It therefore appears to be proved, even by these first experiments, that living bacteria brought about this change in the condition of the leguminous plants, and at the same time that they were quite unable to help the other plants that were not legumes.

On pulling the plants out of the soil when their growth was ended, it was found that all the leguminous plants had tubercles on their roots, while there were none on the plants that were not leguminous. Thus it is shown that the tubercles, or the bacteria in them, produced the sudden change in all the plants of one kind, the legumes; and it is indicated that, while these plants were waiting during that brief time after the soil-extract was added before taking on the dark green color and beginning to grow again, they were simply waiting for the tubercles to be formed and ripened for their use.

One remarkable feature of this series of experiments was that all the plants of the same kind told the same story. Not a single oat, rape, or buckwheat plant revived and resumed its growth; on the other hand not a single pea, seradella, or lupine plant failed to respond to the inoculation, as it is called, of the soil with the bacteria; all that they needed was the help of these microscopic living things; then with the abundance of all other necessary foods that were mixed with the sand at the beginning of the experiment they were fully equipped for rapid and vigorous growth.

In another experiment some sand was first heated to redness in order to drive out all the nitrogen in it and to kill any bacteria that might be there; this sterilized sand was then mixed with the needful quantity of all the plant foods except the nitrogen, and some of the extract of garden soil was also added; one grain of buckwheat, one of oats, and one pea were planted in this sand all in one pot; water was added, and the pot under a glass shade was then put where the sun would shine on it during the day. The result was the same as before: neither the buckwheat nor the oat seedling recovered from the nitrogen hunger; but the pea grew luxuriantly and was happy as it towered above its starved companions; even though the roots of the pea were probably intertwined with those of the other plants, and the roots of the latter were perhaps in contact with some of the tubercles of the pea roots, still these plants could make no further growth.

Another experiment was tried with thirty pea plants, each one in a pot by itself; the soil was prepared in the same manner as in the other experiments except that the extract of soil was added to ten of the pots only. All the plants grew to the height of about four inches, and then the growth stopped in every pot; after a little time the plants that had been inoculated with the soil extract suddenly took on the usual color of healthy plants, and went on growing. All these plants had an abundance of tubercles on their roots; the other plants had no tubercles.

Of course this discovery excited a great deal of interest throughout the agricultural world. Other investigators repeated the experiments for themselves, and obtained the same results. Among these were Lawes and Gilbert, of England, who have been carrying experiments along agricultural lines for sixty years, and have done an immense amount of work for the advancement of agriculture;

they were fully convinced by the results of their own experiments that the discovery of the Germans was correct.

That the nitrogen is really taken from the free nitrogen of the air by the leguminous plants has been conclusively proved by another experiment. Legumes with tubercles on their roots have been grown in pots in a closed glass case, so tightly constructed that no air could pass in or out. The air in the case was analyzed before and after the experiment, and it was found that some of the nitrogen was missing; and this could be explained only by supposing that the plants growing in the case, or the bacteria in their roots, consumed it.

There are a great many kinds of bacteria in the world; and there seems to be a number of different kinds of bacteria that bring about this fixation, in the plant, of the nitrogen from the air, each kind doing its best work for that species of a legume from which it was taken, and in a few cases doing as good work for other species. In other cases certain kinds of legumes get very little help from bacteria taken from another kind. This means that if you want to raise a good crop of peas with the aid of tubercles on the roots you will be most successful if you inoculate with soil in which peas have been growing, and in which there are pea bacteria; and that if you inoculate with some soil where there has been a growth of locusts or lupine, and where the bacteria are what we might call the locust variety or the lupine variety, your peas will not turn out so well. The pea and the vetch are less particular than other plants about the source of the bacteria with which they are inoculated; lupine, on the contrary, is exceedingly particular in this respect, and will make hardly any growth at all if inoculated with bacteria from any other species of legumes; but give it bacteria from a soil in which lupine has grown, and also an abundance of potash and phosphoric acid and lime, and it will do wonders. The yellow lupine is considered in Europe as the best plant to be used for the improvement of poor, sandy soils; it will grow freely where other legumes will nearly starve for want of nitrogen even if properly inoculated.

The quantity of nitrogen that can be taken from the air by some of these plants under favorable conditions is sometimes enormous. In the case of the first series of experiments that I described, the amount of nitrogen that some of the plants contained and which

they had taken from the air was determined by analysis; one of them contained 20 grains of nitrogen. The quantity seems small, but when we consider how much would be gained by all the plants that could grow on an acre of soil the result is very large. Each of those 178 pots contained 9 pounds of soil; the weight of the soil of an acre of ground to the depth of 12 inches is about 3,500,000 pounds; 9 will go in 3,500,000 about 400,000 times; we might have then 400,000 pea plants on one acre; this number of plants would take from the air 115 pounds of nitrogen, provided that every plant grew as vigorously as those in the pots. If this number of pounds of nitrogen be multiplied by six the product will be very near the weight of nitrate of soda that one would have to buy in order to get 115 pounds of nitrogen, or nearly 700 pounds. No one who has used this fertilizer, and knows how to use it, would dare to put 700 pounds on an acre; he would know that such a dose would do serious damage to the crop; a third as much would be the most that he would care to apply. Some remarkable and almost incredible results were obtained by a French chemist of great renown. In six trials with vetch, growing eleven weeks, there was gained from the air a quantity of nitrogen equal to from 1,285 to 1,728 pounds of nitrate of soda calculated per acre. Clover growing ten to twelve weeks gained in six experiments nitrogen equivalent to from 412 to 1,150 pounds of nitrate of soda. With lucerne, vetch, and some other leguminous plants growing together the gain in nitrogen was equivalent to from 728 to 3,717 pounds of nitrate. With lucerne alone, growing from eighteen to twenty-one weeks, the gain of nitrogen was equivalent to from 2,471 to 3,885 pounds of nitrate. The meaning of these figures is that these several crops, supposing each one to be growing on an acre of soil for periods ranging from ten to twenty-one weeks, would gain from the air quantities of nitrogen which if bought in the form of nitrate of soda would require from 412 to 3,885 pounds of this fertilizer; the first figure was the lowest result, with clover; the second was the highest result, with lucerne.

The potted soils in which these plants grew were carefully seeded or inoculated with the tubercle bacteria by means of extracts of other soils in which the same kinds of plants had been grown; the soil itself was well fertilized with all the foods needed by the plants except the nitrogen; the plants were kept supplied with the right

amount of water, so there was never any suffering from drought. Of course in the open field, where the supply of water is variable, and occasional droughts are unavoidable, there would be less vigorous growth, and consequently less nitrogen would be drawn from the air. But nevertheless these figures given above do at least prove that there are great possibilities in this natural method of getting nitrogen in the combined state from the inexhaustible supply of free nitrogen in the air. This combined nitrogen can be made useful for other crops that *must* get their nitrogen from compounds of nitrogen in the soil, either by using the nitrogen-gathering crops for fodder and spreading the manure in the fields, or by ploughing the crop in; it has been shown by experiments that the nitrogen of a crop used for green manuring is quite as available as the nitrogen in stable manure, or even more so.

Since we now know that clover can gain nitrogen from the air, we can the more easily believe the assertion of a most successful New York farmer, now dead, that he bought no manures for many years, and although exporting a large quantity of nitrogen from his farm in the dairy products sold, he had kept it in a highly fertile condition by frequently growing clover in the rotation and using plaster freely. He did not know that the clover drew nitrogen from the air while he was thus using his clover crops to maintain fertility; but he was a thinking man, and he undoubtedly thought that that was just what the clover did.

Since this discovery was made of what the leguminous plants can do for the farmer and the horticulturist, it has been affirmed by some investigators that all kinds of plants, whether legumes or not, can get nitrogen from the air and work it up into chemical compounds; but so far as our ordinary crops are concerned it has been conclusively proved that if they are not legumes they can get their nitrogen from the soil only. Mustard has been more frequently mentioned in this connection than any other plant. The latest investigation of this question was made at the Department of Agriculture in Washington. The results thereof fully confirmed the results of all the careful experiments made before in Germany and elsewhere, to the effect that mustard, like wheat, oats, maize, and all the small and the large fruits, etc., can get its nitrogen only from the soil.

The question as to what causes the growth of the tubercles on the roots of leguminous plants has been much studied. These

studies have led to the conclusion that the bacteria are the first cause; that the tubercles are not something that the plant itself causes to grow, any more than the gallnuts on an oak tree are caused by the tree, or than the swelling after a mosquito bite is caused by the hand on which it appears. These bacteria can be cultivated as any plants can be cultivated; they are plants, not animals; they can be carried through many generations. Starting with some material taken from the tubercles on a pea root, it is planted in a suitable medium; from the crop thus obtained another planting can be made in a fresh quantity of the same medium, and so on indefinitely. This medium in which the bacteria can be made to grow and multiply, or this soil for bacteria, as it might be called, is a jelly-like substance of such a nature that the bacteria will live and thrive in it, as higher plants will live and thrive in a rich soil made up of sand, clay, and other things. From the last culture made of the pea bacteria a plant can be inoculated with all the usual results of such inoculation; the result may be just as satisfactory as if the inoculating material had been taken fresh from a pea root. In one case where a pea plant was inoculated in this way over 4,000 tubercles were counted on its roots. That which can be done with the bacteria of the pea can be done with those of any other leguminous plant.

Many experiments have been made in inoculating one species of a leguminous plant with bacteria from another species; such as the inoculation of a pea root with bacteria from a clover plant, or clover with lupine bacteria, and so on. These experiments have proved what has been stated before, that each species generally produces the most tubercles and gets the most nitrogen from the air with the help of its own kind of bacteria. The conclusion is also established that these bacteria are the only agency through which the leguminous plants can enrich themselves with nitrogen compounds made from free nitrogen and other substances drawn from the air.

It is a curious and very interesting operation by which free nitrogen is thus taken into the plant and converted into nitrogen compounds. It is really a partnership between the plant on the one hand and the bacteria on the other; the plant provides the bacteria with a suitable place for their underground home; the bacteria build their little houses there and then proceed in some mysterious way not yet understood to provide the plant with com-

bined nitrogen — thus, so to speak, paying rent for the root surface on which they have built their tubercles. The higher plant, the pea, bean, or clover, does not suffer any damage on account of these growths on its roots, constructed and occupied by the lower plants, the bacteria.

It seems probable that there are not so many species of bacteria as there are species of plants that can be helped by them. The pea is one leguminous species, the bean is another, lucerne another, and so on through the whole list. In no way whatever can we convert a pea plant into a bean or into clover. There are surely different kinds of bacteria, each one of which is best adapted to the work of getting nitrogen from the air for some particular species of legume; but these different kinds of bacteria are to one another somewhat as the different varieties of some one vegetable are to one another — such as the different kinds of squashes listed in the seed growers' catalogues, or of corn or cucumbers. It is now supposed that these kinds of tubercle bacteria are only varieties of one species; and that they are produced each one by growing on some one species of plant. Bacteria that have been growing and multiplying on pea roots for some years, season after season, are in some way different from those which have grown for a time on the bean; and those whose home has been the bean are not just the same as those that have grown on clover. If the pea variety of bacteria is used to inoculate a bean plant the result will not be so good as when the bean is inoculated with the bean variety; but if the descendants of these pea bacteria that were used to inoculate the bean go on living for a number of seasons on the bean plant they seem to become modified into the bean variety.

These bacteria thus seem to have a wonderful power of changing their character under changed conditions of their surroundings. They seem to be present in all arable soils, or at least in all soils in which leguminous plants have been grown at some previous time. When no leguminous crops have been grown for a considerable time in any field the bacteria seem to pass into a variety which will produce tubercles on any species of legumes, although not so abundantly as when the plant is inoculated with its own variety. This kind of bacterium, which can produce tubercles on any legume, has been named the *normal* tubercle bacterium. If a field has only normal bacteria in it, and if some one species of

legume is grown on that field for a series of years, the normal bacteria are supposed to be gradually changed into the variety that is best fitted for this species.

A very interesting illustration of this operation is described as follows: Twenty seedling acacias were set out in a plat where no legumes had been grown for a long time. The plat was surrounded by a narrow rim of land on which vetch had grown as a weed for many years. All the acacias that were in the more central parts of the plat grew well, and at the end of the season had tubercles on their roots, while those that were in the rim or near it made but a poor growth and had no tubercles. These results indicated quite plainly that the soil of the rim of the field was full of bacteria that had become so completely modified into the vetch variety during this long period of time that they were of no use to the acacias. It was also indicated that the bacteria in the central part of the field were the so-called normal bacteria, and were therefore capable of developing tubercles on the roots of any species of legume that was capable of having tubercles, and which might take possession of that part of the field.

Another interesting experiment illustrates this property of the tubercle bacteria. Twenty-two different species of legumes were inoculated or seeded with pure tubercle-bacteria from pea plants, and twenty-one of the same kinds of plants were inoculated with pure locust tubercle-bacteria. The first lot of bacteria could be considered as best fitted for getting nitrogen for the pea, and the other lot were best fitted for the locust. Sixteen of the whole number were not at all helped by the locust bacteria, and thirteen were not helped by the pea bacteria. Of those inoculated with the locust bacteria that did have some tubercles on their roots only one gained much benefit; that one was the locust plant itself. The pea inoculation was really successful only on the pea and the bean. Here again the bacteria modified by repeated culture into the pea variety were really useful only when applied to the pea plants, and the bacteria converted by repeated culture into the locust variety were useful only on the locust.

The distribution of these tubercle bacteria in the soil has not been much studied. The number of them would appear to be large enough, ranging as it does in some soils where legumes have been growing from 78,000 to 143,000 in one cubic inch of soil. They do not spread rapidly in the soil, and need the help of tillage

in order that they may be uniformly distributed. In one experiment six peas were planted in a pot of soil free from nitrogen; soon after the plants appeared above the soil one of them was inoculated by scratching the crown of its roots with the point of a needle that had been dipped in a tubercle of a pea plant from the garden. This inoculated plant grew to the height of forty-two inches; the other five made only half as much growth in height, and had each of them only half as many leaves as were on the other plant. At the end of the experiment tubercles were found only on the plant that had been inoculated; the bacteria seemed to remain right where they were put. Therefore if a soil is inoculated near the surface they will remain thereabout; if the inoculation is further down in the soil there the bacteria will be most abundant at the end of the season. In the first case the tubercles will be found mostly on the rootlets near the surface; if the inoculation is at the depth of eight or ten inches the tubercles will be found mostly on the rootlets at or about that depth. The importance of a thorough stirring of the soil for distributing the bacteria is thus clearly shown.

The tubercles are more abundant on plants growing in poor loams than in rich soils where the crops can find sufficient nitrogen without the help of tubercle bacteria; there being little or nothing for the bacteria to do, but few if any tubercles appear. The poorer the soil is in nitrogen, the more vigorous is their growth, for there is so much the more work for them.

These bacteria seem to possess a very great resistant power against decay and death. It has been observed that the same kind of bacteria may be found in the soil even if no legumes have been grown there for a long time. That they are there and ready for work is proved by the abundance of tubercles on the roots of legumes planted in that soil after such a long period. They probably live through the winter by producing germs or spores that can withstand low temperatures; these spores bear the same relation to the bacteria from which they were produced that the wheat or the barley seed bears to its parent plant. As illustrating the above statement, a test was made for the presence of bacteria in a soil in January; none were found then; in the following summer the soil swarmed with them.

Now let us consider the practical application of this copartnership between certain leguminous plants and the bacteria that build

their houses on the roots of these plants. The first tests with leguminous plants on a large scale for the improvement of soils poor in nitrogen were made in Germany. with peas, clover, seradella, and lupine, on reclaimed upland bogs and on sandy soils. The best results were obtained on the soils poorest in nitrogen, and especially on new soils. In many of the trials the crops failed entirely unless inoculation was applied. On very poor, sandy soils that were plentifully supplied with potash salts and the basic slag phosphate, a fertilizer much used in Germany to supply phosphoric acid for the crops, the results were wonderful. The same soils yielded very poor crops without inoculation.

The history of one of these trials is instructive. The plat was a small one; about twenty pounds of potash salts, nine pounds of slag phosphate, and twenty-four pounds of a soil in which lupine had been growing were scattered over the soil of the plat; the lupine seed was then sowed and the plat was harrowed to mix all these additions with it as thoroughly as possible. Other plats near by were left uninoculated, but were supplied with the same fertilizers as those that were put on the trial plat. There was no difference between the vegetation on the different plats as long as the plants could use the nitrogen of the seed. Eight days after the formation of the first leaf the plants on the inoculated plat had tubercles abundantly on their roots, while none were found on the roots of the other plants. Eight days later the darker green color of the inoculated plants was distinctly visible, and this difference became more and more marked as the season advanced. The crop harvested on the uninoculated plat was only 100 pounds; the yield of the inoculated plat was 475 pounds. In other tests of a similar character from two to sixteen times larger crops were obtained on the inoculated plats than on the uninoculated ones.

In the management of this kind of inoculation on a large scale the inoculating material must be taken from a field where the same kind of a crop has been growing that is to be grown in the field to be improved. Evidence enough has been given in what has gone before to show that a plant is almost sure to make a better growth and gain more nitrogen if inoculated with its own modified variety of the bacteria. The soil to be improved should be one that really needs nitrogen; time and labor will be wasted if this rule is not observed. The soil of this field should be well pulverized by tillage in order that the inoculating material can

be intimately mixed with it and uniformly distributed. The quantity of inoculating soil should be, according to one authority, from 1,700 to 3,500 pounds per acre of soil to be treated. The inoculating soil should be well pulverized; otherwise it cannot be uniformly mixed with the other soil. It is good practice to let this soil freeze and thaw two or three times after taking it from the field, for then it can be much more easily made into a fine powder. This inoculating soil should be scattered by hand and then mixed with the other soil by the harrow, but it must not be carried too far down; it is best to apply it when the seed is sown. If the soil is sour it should be sweetened by the addition of lime, with care not to add too much.

As has already been stated, lupine is the best crop to be used in case a very sandy soil is to be treated; vetch appears to be best suited for poor loams. Experiments have shown that the addition of a little nitrate of soda at the time that the seed is planted is useful; it serves to feed the plants in that short period during which they have to wait for the development of the tubercles on the roots — that little waiting time which begins when the nitrogen of the seed has been consumed; if the nitrate is added the plants will keep on growing while the tubercles are getting ready for them and no time will be lost.

In this connection an account of an experiment tried for the purpose of testing the comparative power of different legumes to gather nitrogen from the air will not be out of place. Thirty-one different species of plants were thus tested. Nine of them gained only 65 to 86 pounds of nitrogen, equivalent to from 390 to 510 pounds of nitrate of soda; seradella and two species of clover were in this group. Ten species gained from 88 to 143 pounds, equivalent to from 528 to 858 pounds of nitrate; in this group were two species of vetch, three of clover, and the kidney bean; the red clover made the largest gain, which is an important fact, as this crop is so widely grown in this country. From 175 to 220 pounds of nitrogen were gained by five species, one of which was a vetch, one a lentil, one the ordinary pea, and another the everlasting pea; these quantities of nitrogen are equivalent to from 1,050 to 1,320 pounds of nitrate. Three species of lupine, the blue, the yellow, and the white, gained respectively 275, 328, and 371 pounds of nitrogen, equivalent to 1,650, 1,968, and 2,226 pounds of nitrate. The great nitrogen-gathering power of the lupines is

very clearly shown by these figures. But whatever may be the capacity of one legume or another for gathering nitrogen, it will amount to nothing if there is not a good supply of available potash and phosphate in the soil.

The labor and expense involved in the inoculation of soils on a large scale in the manner above described are so great that an attempt has been made in Germany to prepare pure cultures on a large scale of the several kinds of bacteria which correspond to the different species of plants that may be used for gathering nitrogen, or that may be grown for sale or for fodder. If it is desired to inoculate the soil of a field where peas have never been grown so as to get a good crop of the same it is only necessary to buy a small bottle or a few small bottles of this material according to the size of the field to be planted, and with the contents to inoculate the soil, either by mixing the inoculating material with the seed to be planted or with a small quantity of fine dry earth and scattering this mixture over the soil to be treated. The labor and cost of this method of inoculation are much less than of the other method.

The substance used is called nitragin. Each bottle, costing in this country $1.25, contains material enough to inoculate somewhat more than half an acre. To inoculate the soil by the first method above mentioned the bottle is gently warmed to about the temperature of the body, its contents are added to a quart of clean, warm water and the mixture is thoroughly stirred; it is then poured on the seed to be planted and the whole is worked over with the hands till the bacteria are evenly distributed; some dry sand or soil is then mixed with the moist seed and it is ready for the planting.

In the other method of inoculation the water to which the contents of the bottle are added is carefully mixed with about fifty pounds of fine, dry earth; this mixture is then allowed to dry in the air, but not where the sun will shine on it, or it may be dried by mixing it with more of the dry earth; it is then uniformly scattered over the field to be inoculated, and harrowed in to the depth of about four inches.

This nitragin can now be purchased in this country through the agency of a German firm in New York. They do not keep it in stock, but order it from Germany as wanted. No less than nineteen different kinds of nitragin are listed in their little catalogue; two species of peas, three of vetch, one of beans, three of lupine, five of clover, and one of lucerne are included in the list.

In 1896 many successful results of the use of nitragin were reported in Germany; not only were larger crops obtained, but they were less injured by fungi than usual; for example, inoculated peas suffered much less from the blight than those that were not inoculated. In another case uninoculated vetch suffered much more from the attacks of an insect than did that which was inoculated. Some of the uninoculated plants died because so much weakened by the pests. It must be acknowledged, however, that the success of this method of inoculation is not yet fully assured. I have met with only a few accounts of its use within the last year, and I do not know how extensively it is applied at present. But the application is so inexpensive and so convenient, and so great are its possibilities as illustrated by some of the figures that I have given, that it certainly seems to me to be worth a trial wherever there are poor soils to be stocked with nitrogen. It should not be forgotten that one year's inoculation may answer, if successful, for three or four years thereafter. It should also not be disregarded that the amount of nitrogen gained by the inoculated vegetation is likely to be much larger than the quantity usually applied to the soil in such a fertilizer as nitrate of soda. Three hundred pounds of nitrate would be as much as any one would care to apply on a growing crop; this quantity of nitrate contains about one-sixth of its weight of nitrogen, or fifty pounds. A ton of nitrate costs now in Boston or New York about $40; at that rate three hundred pounds would cost about $6. Now, if you will read again the figures that I have given for the quantities of nitrogen that may be taken from the air by some of these inoculated legumes, and if it be allowed that even only half as much would be gained in the open field, where the plants cannot be so well cared for as in pots, and if it be considered that the crop can be used for fodder if so desired, and that nearly all the nitrogen in the crop will be returned to the soil in the manure, you will, I think, come to the conclusion that it is an economical way to increase the stock of nitrogen in your soils.

There is another way in which air nitrogen can be worked into a chemical compound; namely, by the action of the electric current on the components of the air; nitrate of soda can be made by this operation. It is stated in a recent scientific journal that where water-power is abundant for making the electric current,

nitrate of soda can be made at a cost of $25 per ton, while the nitrate from South America costs $37 at least.

Many of you may remember the flurry caused two or three months ago, when a most noted English chemist affirmed in a public address that the beds of nitrate of soda in South America would be exhausted early in the coming century; and since that fertilizer is our mainstay for the supply of nitrogen, the civilized world must fall into the condition of nitrogen hunger; or, as the lecturer expressed it, "England and all the civilized nations stand in deadly peril of not having enough to eat." It would not be surprising if many people should be really frightened by such a statement coming from such a source. Several competent writers have shown that there is at least no immediate danger of such a catastrophe. If we take into account the vast stores of nitrogen in our arable soils, the large quantity of nitrogen in the nitrate beds of South America, and above all the immense supply of free nitrogen in the atmosphere about us upon which we can draw *ad libitum* by means of our leguminous plants, and also by means of the electric current, there seems to be little danger that we shall "be in deadly peril of not having enough to eat," or even that our children's children will.

The atmospheric air presses on every square inch of surface of the earth with a weight of fifteen pounds. Four-fifths of this weight is due to the nitrogen in the air. In other words there are twelve pounds of nitrogen over every square inch of an acre of soil. Calculate the number of square inches in an acre of surface, multiply that by twelve, and you have the number of pounds of nitrogen over every acre of soil. The number is 75,271,680 pounds. A crop of wheat, straw and all, asks for only 48 pounds; further comment is unnecessary.

The lecture was illustrated with stereopticon pictures of the roots of nitrogen-gathering plants, which added much to its interest and instructiveness.

A vote of thanks to Professor Caldwell for his interesting and instructive lecture, in which he had brought before the meeting the latest discoveries of science on the subject, was unanimously passed.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 25, 1899.

A meeting for Lecture and Discussion was holden at eleven o'clock today, Vice-President BENJAMIN P. WARE presiding.

The following lecture was delivered:

THE AGRICULTURE OF ANCIENT TIMES COMPARED WITH MASSACHUSETTS AGRICULTURE.

By Hon. WILLIAM R. SESSIONS, Secretary of the Massachusetts State Board of Agriculture, Springfield.

Our knowledge of the agriculture of ancient times goes back only to the time since the flood. The history of agriculture among the nations of what may be called classic antiquity is involved in impenetrable obscurity, very few facts on the subject being recorded previously to the times of the Romans.

The Egyptians are supposed to have excelled in agriculture. Moses is the earliest writer, 1,600 years B.C. Agriculture does not appear to have materially changed in those countries even to the present day. Noah is styled a husbandman, and is said to have cultivated the vine and made wine. In little more than three centuries Abraham is stated to have had extensive flocks and herds and great wealth in gold, silver, etc. Isaac, his son, is said to have sown and reaped one hundred fold. Corn seems to have grown in abundance in Egypt, for Abraham, and afterwards Jacob, had recourse to that country in time of famine. Irrigation seems to have been practised in Egypt in Abraham's time, for it is said, (Genesis 13, 10) that the plain of Jordan was watered everywhere "even as the garden of the Lord, like the land of Egypt." Later, in the days of Jacob and thence on to Moses, irrigation was common in Egypt.

The agriculture of Greece was learned from the Egyptians, and some ancient Grecian writers state that there were more than fifty ancient Grecian authors who wrote on agriculture. The works of only one of these appear to have been to any extent preserved. The necessary agricultural implements catalogued by this writer are a plough and a cart. The cart had two low wheels and was ten spans in width. The plough consisted of three parts, the shoe-beam, the draught-pole, and the plough-tail. The shoe-beam is to

be made of oak and the other parts of elm or bay. They are to be joined firmly with nails. Nothing is said of iron in its construction. The beasts of labor mentioned are oxen and mules. The oxen were most common, and four and a half years is given as the best age at which to purchase oxen. He also says that the most desirable age for a ploughman is forty; he must be well fed, go naked in summer, rise and go to work early, and have a sort of annual feast, proper rest, and good food and clothing; coats of kid-skins, worsted socks, and half boots of ox-hide in winter. The products of Grecian agriculture were sheep, goats, swine, cattle, mules, asses, and horses, the grains and legumes at present in cultivation, and the vine, fig, olive, apple, date, and other fruits. It does not appear that other than wild grasses or herbage plants were in use, no grass seed being sown. No doubt the other nations of that day had a similar agriculture, as they had the same opportunity to learn of the Egyptians.

The allusions in the Old Testament to the agriculture of the Jews are mostly incidental, but enough is said to prove that all the people, from the king to the poorest individual, were interested in agriculture, and that it was almost the only industry, ordinary manufactures being carried on in the family of the farmer rather than by people who devoted their whole time to such business. King David's farming was managed by seven officers. King Uzziah "built towns in the desert and digged many wells, for he had much cattle, husbandmen also and vine dressers, for he loved husbandry." Elisha was found ploughing with twelve yoke of oxen before him. Job had 500 yoke of oxen and 500 she-asses, 7,000 sheep, and 3,000 camels. Isaiah describes ploughing and sowing and threshing, and the threshing floor is often spoken of. Winnowing was done by the wind without the aid of machines or other contrivances except the common sieve.

The Phœnicians were agriculturists as well as traders, and no doubt they introduced their agriculture into their colonies at Carthage, Marseilles, and other places.

The Republic of Carthage included Spain, Sicily, and Sardinia, and flourished for seven centuries, and agriculture was doubtless early introduced there. When Carthage was destroyed by the Romans, 147 B.C., of all the contents of the libraries the Romans saved only the twenty-eight books on agriculture of the Carthaginian general Magon, and these were translated by order of the

government for use of the Romans, and from this grew up the celebrated Roman agriculture, described by Cato, Varro, Virgil, Pliny, and others. At that time the North of France, Great Britain, and the rest of Europe were in a wild state, inhabited by nomadic nations who lived largely by hunting, sometimes keeping flocks and herds, but seldom, if ever, cultivating the soil. When Britain and Northern Europe were overrun, the Roman soldiers, to all of whom the art of agriculture was familiar, carried on farming wherever they were permanently stationed. These soldiers also taught the art to the barbarian inhabitants of every country conquered by them. Thus was the improved agriculture of Egypt, Greece, and Rome made known and put in practice in the parts of Europe from which our ancestors came.

During the middle ages, after the fall of the Roman power in Europe, agriculture was extremely neglected and almost abandoned. Almost savage Saxons conquered Britain and systematically robbed the people of their crops and cattle. The result was a terrible decadence in agriculture. But when the Normans invaded England in the eleventh century they brought with them advanced ideas and practices in agriculture. Many thousands of husbandmen from the fertile and well cultivated plains of France, Flanders, and Normandy settled in the island and introduced the advanced methods of their own countries. Orchards were planted, lands were drained, rivers were diked. Norman priests and monks were good farmers, and the lands allotted to them by the conquerers were cultivated with great care, often by their own hands. They used ordinary manure or dung to increase crops, and also learned the value of marl as a fertilizer and used it quite extensively. The kings encouraged agriculture and sometimes issued edicts compelling owners to cultivate their land to a certain extent and in a certain way. The implements of this period were much like those of Ancient Greece, and they continued in use until about the time of our Revolutionary War.

About the year 1534 appeared the first English treatise on agriculture, entitled the "Book of Husbandry," containing directions for draining, clearing, and enclosing a farm and for enriching and reducing the soil to tillage. Lime, marl, and fallowing were strongly recommended.

Laws were made requiring the practice of improved agriculture and the raising of hops and flax; also requiring the castration or

destruction of horses that were not up to a certain size. The legal standard was fifteen hands in stallions and thirteen in mares, and unlikely specimens were by law consigned to death. Later sovereigns imported superior specimens of horses with which to improve the breed of English horses. Improved grasses for making hay were then unknown, and straw and hay of water grasses were the only dependence for winter fodder. Agriculture now began to improve. It is not singular that this beginning of improvement was contemporaneous with the invention of printing and the revival of literature which ensued as a consequence.

The "Book of Husbandry" before referred to was filled with wise advice and practical directions for the raising of crops and the breeding of cattle and horses, much of which was not improved until some centuries later, and some of which would be considered orthodox at this day. But some maxims and directions for farmers' wives would hardly be accepted by our wives and daughters today, especially by those who believe in woman's suffrage instead of woman's suffering. The author said, "It is a wives' occupation to winnowe all manner of cornes, to make malte, to washe and wringe, to make heye, sheve corne and in time of nede to helpe her husbande to fyll the mucke waggon or dounge cart, drive the ploughe, to load heye, corne and such other. And to go or ride to market, to sell butter, chese, mylke, egges, chickyns, capons, hennes, pygges, gese, and all manner of cornes."

Efforts for improvement continued and laws were from time to time made to quicken the pace. In Elizabeth's time (1563), as cattle were less plentiful than was desirable, a law was made forbidding the eating of flesh on Wednesdays and Fridays on forfeiture of three pounds. Great pains were taken to have it understood that it was a political and not a religious measure. It was not until 1645, twenty-five years after the landing of the Pilgrims, that clover and turnips were introduced into England. Potatoes were introduced into England in 1565, but did not attract much attention for nearly one hundred years. The advent of clover, turnips, and potatoes into Britain marks an epoch in the agriculture of our ancestors, for although the exciting and terrible times of Charles I., Cromwell, and Charles II. were depressing for agriculture as for every other industry, these important helps to stock raising and additions to human food began to have a marked influence throughout Great Britain and Ireland. Laws

providing for bounties on corn exported and duties on corn imported were also made and had a wonderful effect in stimulating British agriculture, but this was before the days of Cobden and free trade. Manufactures and commerce also increased wonderfully in England, beginning about 1760, and, with the consequent increase of wealth, gave a powerful stimulus to rural industry, and augmented agricultural capital, by creating a home demand for the products of the soil and the increase of the flocks and herds. Most of the inventions for economizing labor and increasing fertility have been introduced since the days of Cromwell. The wonderful improvements in the breeds of cattle, sheep, and swine have been made since the same date. Robert Bakewell began this great work about 1750 by improving his father's flock of sheep by selection and cross-breeding. Afterwards the same practice and principles were applied to cattle and swine and resulted in our improved breeds. The influence upon the cattle of England and America is almost beyond comprehension. The marked improvements in implements began about this time, for as before remarked, the farm tools of 1750 were hardly an improvement over those used in Egypt in the time of Joseph, or in Greece in Xenophon's time, or in Rome in the time of Pliny. This brings us down to the time of the beginning of farming in New England.

Allow me to go back a few years and note the changes in Massachusetts agriculture up to the present time.

Massachusetts agriculture began with the Indians. At the time of the landing of the Pilgrims in 1620 it was confined to the raising of Indian corn, beans, pumpkins, and tobacco. The methods of the Indians were of the crudest and simplest kind. They had no domestic animals for draft or burden, or for the supply of meat or milk. They had no knowledge of iron, and were dependent for tools upon what they could contrive out of the products of the chase and the forest, together with what assistance they could gain from the stones that could be selected from the surface of the earth. The land was all covered with forest and was cleared by burning down the trees and brush, and prepared for crops by digging with rude hoes made of clam shells, or the shoulder-blades of deer or moose, the handles being tied on with thongs of deer-hide or native hemp. The crops were cultivated with the same tools, and were even in that day fertilized by the application of fish, buried in the corn hills.

The first white settlers of Massachusetts knew nothing of these native productions of the country. They brought with them no teams or domestic animals, and only the rude hand tools of that early day. Their small stock of English seeds was mostly consumed to ward off starvation during the first terrible winter, and had it not been for the timely discovery of the Indians' store of corn, the whole party would probably have died of hunger. As it was, about one-half their number succumbed to disease, which was the result of privation and exposure, before the first crop was harvested. This crop was so slight that, without the aid of fish and game, they could not have lived through the second winter.

On the arrival of the second party of settlers in November, after the first harvest, their supply of corn was so small that the whole population was put upon half allowance until the next crop should be gathered. This next crop was but little larger than the first, and was all consumed before the third was harvested; and on the arrival of sixty emigrants, in July, 1623, they had only boiled lobster and fish, without bread or vegetables, to set before the newcomers. The third crop was more bountiful, but was raised without teams or ploughs. They had no mills to grind their corn, and it was boiled or roasted while soft, and parched, or pounded into meal when ripe. The following year, 1624, the first cattle were brought over. One bull and three heifers comprised the importation. They were small, and, measured by the standard of today, very inferior, but they were valued highly. The increase from these and other importations in the following years sold at very high prices. Twelve years later, in 1636, cows sold for from 25 to 30 pounds sterling, equal to from $125 to $150 of our currency, each. It must be remembered in considering these first cattle of Massachusetts that one hundred years later the weight of the beef cattle of England, in the Smithfield market, averaged only 370 lbs. per carcass.

All the agriculture of the colony for the first twelve years was carried on without a plough, by hand tools alone, and these made almost entirely of wood. In 1637, seven years after the settlement of Boston, and seventeen years after the landing at Plymouth, there were but thirty-seven ploughs in the whole colony, and these were made of wood with perhaps a rough iron point.

Potatoes were introduced in 1629, but were not much grown in the early years of the colony; in fact, for the first one hundred

and twenty-five years they were not considered an important crop. The first apples were gathered in 1639, nineteen years after the first settlement, and until after the Revolution this fruit was valued only for cider making, and the varieties grown were good for nothing else. The agriculture of the early settlers was only to raise something to sustain life, and their ideas of agriculture were as poor and crude as their cattle and tools. Their cattle were all wintered on wild marsh hay and summered by browsing in the woods. Grass seed was not sown except in experimental patches until the time of the Revolution, one hundred and fifty years after the first settlement and less than one hundred and twenty years ago.

The early settlers' hope of bettering their condition was not based on a better agriculture, for there was no home or foreign demand for agricultural products. The Spanish adventurers of that day were looking for mines of gold and silver; the English for opportunities for trade in furs and fish. New settlements in Massachusetts were made where the location promised good fishing, or trade with the Indians. During the first thirty years forty new towns were founded, among them Springfield, on the Connecticut river, a hundred miles straight into the wilderness. The condition of agriculture did not much improve until after the Revolution. The only demand to be supplied was for food and clothing for the farmer's family, and for the merchants, sailors, and fishermen of the colony. There was not a city in the State for the first two hundred years, or until 1822, within the memory of many now living. Until the War of 1812 the demand for farm products was too small to stimulate production. Since that time manufacturing, commerce, and trade have been increasing, cities and large towns have grown, population has rapidly increased, Europe has competed with our urban population for the products of the soil, and a market has thus been assured.

But as the demand increased our enterprising young men began to look for better land. The average soil of Massachusetts is hard and rough. Western New York and the Western Reserve afforded fertile soil at a low price, and almost an exodus commenced. From my own little town of less than eight hundred and fifty inhabitants, more than sixty young people in the heyday of manhood and womanhood left for the Western Reserve within ten years.

The increased demand for agricultural products also stimulated the enterprise of those who stayed at home. The attention of the foremost men of the State, wealthy merchants and professional men of Boston, and prominent farmers, had, soon after the close of the Revolutionary War, been attracted to the backward condition of agriculture, and they had been incorporated as the Massachusetts Society for Promoting Agriculture. Their efforts were zealous, but the people were not easily influenced to try new methods. This society raised money by subscription, published an agricultural paper, encouraged the formation of county societies, erected a hall for the exhibition of agricultural products, and paid large premiums for essays on agricultural subjects and for experiments in agriculture. It also imported specimens of the best breeds of cattle, sheep, horses, and swine, and placed them where the farmers could use them for breeding purposes at a nominal expense, and thus contributed largely to the improvement of the live stock of the State.

This society held a ploughing-match and cattle-show among the first in the country. At the first ploughing-match the old wooden moldboard plough was the only one in use. The first cast-iron plough made in sections was made in 1819. Previous to 1820 it had been almost impossible to create any enthusiasm for the improvement of methods among the farmers, but the growth of cities and large towns and the commencement of manufacturing had made a market, while the publications of the agricultural societies and the exhibition of the valuable imported animals now began to stimulate the farmers to effort for a better agriculture. The State Legislature was affected by the change of sentiment, and in 1819 provided that a bounty of $200 should be paid to county agricultural societies that should raise $1,000 for the promotion of agriculture, and in like proportion for any greater sum not exceeding $3,000, to enable them to offer premiums for the best domestic animals and agricultural productions. This law has been since modified so as to allow the payment of the same amount of bounty on the same conditions to all societies incorporated whose location is not within twelve miles of any other society receiving a bounty. With this encouragement the number of societies has increased, until we now have thirty-five agricultural societies, each drawing an annual bounty of $600 from the State treasury. The annual exhibitions of these societies, and the more

than one hundred farmers' institutes which they are required to hold each year, have done much to stimulate the enterprise of our farmers, and to introduce among them improved methods and implements.

In 1852 the Legislature established the Massachusetts State Board of Agriculture, composed of the Governor, Lieutenant-Governor, and Secretary of the Commonwealth as members *ex officiis*, three members at large appointed by the Governor, and one member chosen by each of the societies receiving a bounty. Since then the President of the Agricultural College, the State chemist, and the Secretary of the Board of Agriculture have been made members, *ex officiis*, and the Board now consists of forty-six members. The Legislature accepted the congressional grant of land for an agriculture college, and in 1863 incorporated an agricultural college which has been very successful and is a source of pride to the farmers and to the State at large. It is doing a good work for agriculture and for the liberal education of the industrial classes of the State. This college has received many liberal appropriations from the State treasury. The State Legislature in 1882 established on the grounds of the agricultural college the Massachusetts Agricultural Experiment Station, and supports it by liberal annual appropriations in addition to the fees received by the Director from licenses of dealers in and for analyses of commercial fertilizers. Laws for the regulation of the manufacture and sale of commercial fertilizers were early enacted and the Director of the Experiment Station is charged with the enforcement of these laws.

The great West has grown up, and with her gigantic agricultural resources has monopolized the production of the staple food products for the consumers of this country. It also exports hundreds of millions of dollars' worth of these products to Europe, but there is still abundant room for Massachusetts farmers. As these changes have driven them from the production of meat and grain for the markets of the world, the wonderful growth of Massachusetts cities and towns, the increase of her manufacturing and commercial classes, who are thrifty and prosperous and in receipt of good wages or liberal incomes, has created at the doors of Massachusetts farmers a demand for a class of agricultural products that Massachusetts farmers can produce at a profit.

A comparison of the total of Massachusetts agriculture with

that of other States by census statistics makes her agriculture appear of almost trivial importance, if we fail to take into account the relative area of the States and the proportion of agricultural population in the State. The productive area of Massachusetts is less than one-eighth that of New York, less than one-ninth that of Iowa, and less than one-twelfth that of Illinois. Illinois to be equal to Massachusetts in value of agricultural products according to area should produce such products to the value of not less than $636,000,000. The United States Census of 1895 gives Massachusetts a population of more than 2,500,000, or more than 320 people to each square mile of land area. This population is very largely urban, there being by the Census of 1895 thirty-nine cities and towns of over ten thousand inhabitants in this little State. There is no other State in the Union that has as many places of as large population. In addition to these there are forty-five towns that by the same census had between 5,000 and 10,000 inhabitants, making eighty-four municipalities of over 5,000 inhabitants in the State. There are also twenty-two towns having between 4,000 and 5,000 inhabitants in this State. These towns, 106 in number, would all be cities in many of the States, as several States incorporate cities when they have a population of 4,000.

We find also by the State Census of 1885 (I do not find this in the State Census of 1895) that of the whole number of males in the State only 8.28 per cent are engaged in agriculture. This includes farmers, farm laborers, gardeners, market gardeners, persons engaged in the care of animals and in the care of gentlemen's places. Of these, 36,221 are farmers, 35,531 are farm laborers, and 5,505 are other persons. There were by the same State Census 442,616 voters in the State, and supposing that all the farmers are voters, the farmers, including the market gardeners, are but one voter to twelve and one-half voters who are engaged in other occupations, and who represent the population that consumes agricultural products. I may interject here the proposition that this state of things should be taken note of when farmers are inclined to array themselves against the notions and prejudices of the consuming public of the State.

This condition of population shows us why a different kind of agriculture prevails in Massachusetts from that in the larger and less thickly populated States of the central, western, and southern

sections of the country. Our agriculture tends more and more toward the supplying of our urban population with fruit, vegetables, poultry, and dairy products.

By the last State Census (1895) the total value of agricultural products of the State was $52,693,633 — composed of dairy products, $16,301,549; hay, straw, and fodder, $12,491,090; vegetables, $6,389,533; fruit, nursery products, and nuts, including cider and wine, $3,207,806; poultry products, $3,871,318; meats and other animal products, $3,533,019; wood products, including wooden goods, $2,799,514; cereals, $1,104,578; greenhouse and hotbed products, $1,846,297; food products, including canned and dried fruits, vinegar and maple syrup, $516,787; other products, including about $400,000 worth of tobacco, $632,142. By the census of 1890, $594,053 worth of plants and $1,036,409 worth of cut flowers were sold in Massachusetts. Cereals, on which the great West so largely depends, cut but a small figure in the list. Dairy products, fruit, vegetables, meat, poultry, hay, greenhouse products, and a large proportion of all the others are sold in the near-by markets that our numerous cities and large towns afford. These are the lines in which future progress must be made.

Our consuming population is prosperous; many families everywhere among them have large incomes; most of our workingmen and salaried men are liberally paid. They want and can afford the luxuries of life. It is ours to provide them at their doors. If we provide what is wanted, when it is wanted, in honest and attractive shape, we can command remunerative prices. There is little to be hoped for from old-fashioned farming or from haphazard farming. The day is past when "any fool can be a farmer."

Discussion.

The Chairman remarked that after all the time agriculture has been pursued it seems strange how lately some valuable products have been introduced. He remembered when the first cast-iron plough was introduced; he rode a horse to scour the plough, which was done by ploughing in coarse gravel, the iron being very rough.

Varnum Frost asked what were the qualifications necessary for a farmer in order that he should succeed.

Mr. Sessions said that in his lecture he had in mind the condi-

tion of things a hundred years ago, when the brightest boy on the farm was picked out for a minister, a lawyer, or a doctor, while it was thought that the dullest boy on the farm would do for a farmer. The day for that has now passed. In reply to Mr. Frost's inquiry he said that the successful farmer was the brightest and most competent man, and he who loved his calling.

Mr. Frost said that he knew a man who was unable to read or write, who was as successful as any farmer he ever knew. In his opinion farming required good natural common sense, but a liberal education is not necessary. He thought he could tell any one, in five minutes, all there was to know about any branch of farming. Farming is a relief business for a decayed professional or business man.

A. W. Cheever moved that Mr. Frost have five minutes to tell the meeting all he knew about strawberry growing.

Mr. Sessions said that the farmer who was better educated through observation, and through comparison, would be most successful

Mr. Frost said that a farmer to be successful in his vocation today must be a successful business man first.

BUSINESS MEETING.

SATURDAY, March 4, 1899.

A Special Meeting of the Massachusetts Horticultural Society was holden at 10 o'clock today in accordance with the following request:

BOSTON, February 25, 1899.

TO GEN. FRANCIS H. APPLETON,
President Massachusetts Horticultural Society:

DEAR SIR:

The undersigned, members of the Society, respectfully request that a Special Meeting of the Society be called, to be held at as early a date as is practicable, to hear and consider a Special Report to be made by the Executive and Finance Committees, by which these Committees unanimously recommend that the Society purchase a piece of land on the corner of Boylston and Exeter

streets in the city of Boston; to determine what action the Society will take on that report; to consider and determine generally what action the Society will take in the matter of acquiring land for a new building, on erecting a building on such land if acquired, of providing funds for such land and building, and of disposing of the land and building now owned by the Society; and to transact such other business as may legally come before the meeting.

FRANCIS H. APPLETON,	J. WOODWARD MANNING,
BENJAMIN C. CLARK,	GEO. F. PIERCE,
WILLIAM C. STRONG,	ROBERT D. IRELAND,
ROBERT MANNING,	WM. WALLACE LUNT,
MARY C. HEWETT,	JAMES F. M. FARQUHAR,
CHARLES E. RICHARDSON,	JOHN K. M. L. FARQUHAR,
J. H. WOODFORD,	CHAS. H. BRECK,

J. W. HOWARD.

In accordance with this request, agreeably to Section XII. of the Constitution and By-laws, the following notice was sent to every member of the Society:

MASSACHUSETTS HORTICULTURAL SOCIETY.

BOSTON, February 27, 1899.

Pursuant to the provisions of the Constitution and By-laws, at the request of twelve members of the Society, the President hereby calls a Special Meeting of the Society to be held at Horticultural Hall, 101 Tremont street, Boston, on Saturday, the fourth day of March, 1899, at 10 o'clock in the forenoon, to hear and consider a special report, to be made by the Executive and Finance Committees, by which those Committees unanimously recommend that the Society purchase a piece of land on the corner of Boylston and Exeter streets in the city of Boston; to determine what action the Society will take on that report; to consider and determine generally what action the Society will take in the matters of acquiring land for a new building, of erecting a building on such land if acquired, of providing funds for such land and building, and of disposing of the land and building now owned by the Society; and to transact such other business as may legally come before the meeting.

FRANCIS H. APPLETON,
President Massachusetts Horticultural Society.

ROBERT MANNING, *Secretary.*

At this meeting the President occupied the chair and read the call for the meeting.

The President reported from the Building Committee that that Committee had unanimously voted to recommend to the Society the purchase of the Boston & Albany Railroad land at the southwest corner of Boylston and Exeter streets 16,000 square feet of land — 100 feet on Boylston street and 160 feet on Exeter street, at fourteen (14) dollars per square foot, subject to confirmation by this Society at a meeting to be called together immediately for that purpose.

The above vote of the Building Committee was embodied in a letter from the President to Messrs. Meredith and Grew, the brokers for the B. & A. R.R. Co., who replied in a letter which was read by the President, offering to sell 18,600 feet of land at sixteen dollars per square foot for 10,000 feet, and twelve dollars per foot for the remaining 8,600 square feet, making the whole cost $39,200 more than the offer of the Society. The Building Committee thereupon this morning unanimously passed the following vote:

Voted, That in view of the refusal of the Boston & Albany Railroad Company to accept the terms proposed by this Committee for the purchase of land on Exeter street, and the offer of another site at a much lower price, this Committee withdraws its recommendation to purchase the Exeter-street lot, and would submit the whole matter of the selection of a site to this meeting of the Society.

Benjamin C. Clark, of the Building Committee, in behalf of that Committee, offered the following vote and spoke in advocacy of it:

Voted, That it is expedient for this Society to move from its present building to a new one to be built for its use, and that it is desirable to procure land on the corner of Boylston and Hereford streets in the city of Boston for such new building, provided it can be obtained at a satisfactory price.

Francis Campbell moved that the Society purchase land on the northeast corner of Boylston street, fronting on the Fenway, opposite the Massachusetts Historical Society's Building, if the land can be purchased at a reasonable price. This motion was unanimously rejected.

The debate on the motion offered by Mr. Clark was then continued by Benjamin P. Ware, William E. Endicott, Edward B.

Wilder, George E. Davenport, William C. Strong, O. B. Hadwen, Rev. Calvin Terry, and Joseph H. Woodford.

Mr. Woodford made a motion to adjourn *sine die*, which was carried by a vote of 49 to 32.

The meeting of the Society on the fourth day of February adjourned to today at eleven o'clock. The special meeting continued until after that time, but no subject except the purchase of land and the erection on it of a building was brought up.

Adjourned.

MEETING FOR LECTURE AND DISCUSSION.

At the close of the business meeting, a meeting for lecture and discussion was held, Vice-President BENJAMIN P. WARE in the chair.

The following lecture was delivered:

QUESTIONS ANSWERED AND UNANSWERED; THE SEASON OF 1898 ALONG HORTICULTURAL LINES.

By WALTER F. TABER, Poughkeepsie, N.Y.

In many respects the season of 1898 has been a peculiar one in its climatic conditions, and in the results, more or less, of those conditions, many of which have been so striking in their results that I have thought to bring them to your notice somewhat in the order in which they occurred.

You will remember that the weather during March was unusually mild. At my place the frost was all out of the ground and men were digging raspberry plants on the 10th. There was no freezing weather afterward; some days very warm. Got plants dug; vines trimmed and tied. Nearly one hundred days of labor were accomplished in March. With the advent of April a great change took place. For ten days the mercury ranged from 18 degrees to 30 degrees.

April 2d was a cold, bleak, winter day; ground frozen hard. Cold, driving snowstorm; snow fell twice afterward, but soon melted. The months of March and April seemed to have changed places, and the question comes in here: What will be the result?

This question, in so far as it applies to the Marlboro raspberries, admits of an answer. The canes of the Marlboros, which had attained a very fine growth in the previous season of 1897, were

alive to the tips when tied to the stakes about the middle of March, but before the end of April a large proportion of the canes were dead from one-third to one-half of their length. What killed them? Answer: The warm weather of March started the flow of sap in the canes. The cold of April froze the sap and burst the cells, thus stopping the circulation in the leaves.

The last half of April was showery but seasonable. May was ushered in with a shower in the night, and the record of the month gives: 14 days without rain, 17 days with rain, 4 of them very heavy rains.

The week ending May 21st was memorable for its three heavy rainstorms. At this time cherries, pears, and the late strawberries were in full bloom. Pear trees of all varieties were literally covered with blossoms. My Gandy strawberries gave promise of an enormous yield. The outlook for fruit of every kind except apples (this being the off year for apples) was very promising. What was the outcome? Cherries were a very light crop. Pears, excepting Seckels, set but little fruit. My Gandy strawberries, that gave such promise, were almost a total failure, — very little but knots and buttons. Question: What was the cause of failure? I recollect that when attending the Annual Meeting of the Western New York Horticultural Society at Rochester, the subject of the failure of the apple crop in Western New York was under discussion, and Mr. H. S. Hooker said that whenever they had heavy rains at the time of blooming there was always a failure of the crop. Mr. George T. Powell writes me that he has not had a barrel of apples or pears to sell from his orchards this year (1898), and that he attributes the failure to the washing off of the pollen by the heavy rains. Another cause of the lack of fertilization lies in the fact that the rains prevented the bees from doing their work upon the flowers.

Mr. Powell writes me also that the foliage of his currants was affected by fungus, and that he sprayed with Bordeaux when the fruit was one-half grown, but, fearing the results to the fruit, left part unsprayed, with the result that those unsprayed lost their foliage, while those sprayed did not, and he gathered a very fine crop of currants. Along in October a number of buds on the unsprayed bushes blossomed and set fruit, and these buds were on the young wood growth of the present year. Question: What was the cause? Answer: The falling of the leaves checked

their growth and ripened the buds, and the warm wet weather following caused them to blossom and set fruit.

The year 1896 was the off year for apples, especially Greenings, in my section. My trees of this variety are large, probably fifty years old. They were covered with a luxuriant foliage. About the time for the setting of fruit, or a little later (no fruit being on these trees), the leaves began to turn yellow, the green matter being seemingly absorbed, until fully one-quarter of the leaves were of a bright yellow (not tawny yellow), and in a few days they all fell to the ground, and the trees resumed their apparently normal condition. Other kinds were affected somewhat, but not to so great an extent, while trees that were bearing fruit were but slightly affected. Question: What was the cause of this loss of color and consequent fall of the leaf?

The season of 1898 along this line has been full of surprises. A friend of mine living in the great fruit section on the west bank of the Hudson writes me that his apple crop has been a failure, and I will give you what he says in his own words:

"The first appearance of the blight was just after the bloom had fallen. I sprayed thoroughly with Bordeaux and Paris green at this time, as the fruit had set quite heavy; also sprayed again in about ten days, but these sprayings did not seem to have any effect. The foliage at first seemed wilted, and looked as if the branches had been cut off from the tree. After a few days many leaves turned yellow, and fell off; only a very little new growth of wood or foliage afterward. All the fruit dropped within two or three weeks.

"The varieties most affected were Newtown Pippin (called Albemarle Pippin in Virginia) and Spitzenburgh; then Baldwins, Greenings, and Vandeveres. The Hubbardston put out perfect foliage and matured a very heavy crop of perfect fruit, although this kind was among the others most affected.

"The trees that blighted the most were those on which the bloom was heaviest, especially the Baldwins." What was the cause of this blight of leaf and fruit, and what is the remedy? Answer: Cause — excess of water in the soil, diluting the food elements below the amount required to sustain the tree in crop production. Remedy — plant trees on well-drained soil. My friend goes on to say that he sprayed grapes and strawberries with Bordeaux, but with no apparent result, and pear trees with

whale-oil soap solution, but with no apparent benefit, but the application of Bordeaux and Paris green to his currant bushes for the currant worm and leaf blight, part sprayed once, and part twice, entirely destroyed the currant worm, and the foliage remained on the bushes very late. This coincides with the statement of Mr. Powell, and answers the question as to how to destroy the currant worm and retain the foliage of the plant.

This season of 1898 has raised a doubt as to whether the scientists at our experiment stations and colleges understand fully the origin of fungous growths and their manner of dissemination, and how and when and under what conditions spraying can be made most effective. I will here give you one of my own observations. We sprayed our grape vines once with Bordeaux, and later with the ammoniacal solution. Just as the early varieties were beginning to color the Concords showed some signs of rot, and we went through the vineyard and removed all clusters much affected and the affected berries from clusters showing only a few.

I frequently observed affected berries in the centre of those clusters, while those most exposed were perfectly sound. The question as to how or why this fungus should pass by these exposed berries and attach itself to one almost concealed from sight, remains to be answered.

I believe that a healthy plant, like a healthy person, is better able to resist the attacks of disease than an unhealthy one. But what causes the disease, and whether it must come from germs in the soil, or whether the elements are in the air under certain climatic conditions which can produce these results at certain stages during the growth of the plants, are questions of moment.

It has been suggested that perhaps the dampness of the berries retained on the inside of the cluster presented more favorable conditions for the growth of the spores than those on the outside of the cluster where it was exposed and dry.

I had no rot in 1897 in my Concords, and therefore no fungous spores in the soil, but had downy mildew on the Niagaras. The latter were not affected the past season, though weather conditions were more favorable for it.

My experience in the application of Bordeaux to the fruiting beds of strawberries was that it arrested to some extent the spread of the leaf spot, and perhaps I may as well state here that we mowed off the foliage after fruiting, raked it up, and removed it

from the ground. The new growth came up healthy and clean, but later the Marshalls rusted out badly, while the Gandys in adjoining rows remained clean. More leaf spot has developed on strawberry foliage the past season than ever before.

I have another friend, a prominent grower of fruit in the Hudson Valley, who has had a singular and to him puzzling experience in the treatment of his vineyard. He sprayed it five times, and his work is always thoroughly and carefully done. He had a light crop of poor quality, — most of it sold for wine purposes, — and his question is: What is the good in Bordeaux? In contrast to this a neighbor of his, owning a very large vineyard, writes me that he sprayed several times with a mixture of twelve and thirteen pounds of copper and nine pounds of lime to fifty gallons of water (this is the old formula as first made and used, but it proved to be a waste of material), and had a full crop with little or no loss. While on the subject of spraying I will state the experience of Mr. George T. Powell the past season in spraying his cherry trees for fruit rot, which threatened to destroy *his* crop as it ultimately did the crops of his neighbors. He first used two ounces of sulphate of copper in forty-five gallons of water, then increased to four ounces and later to six ounces to the same quantity of water, spraying the fruit thoroughly (sometimes twice the same day) and carefully watching results.

Finding that the disease was arrested, and fearing the stronger solution might injure the fruit, the quantity of copper was reduced to three ounces in forty-five gallons. Soon the decaying fruit dropped to the ground and half a crop of clean, perfect fruit was gathered, fully proving the efficacy of the spray. As I understand it, this treatment was recommended for trial by an Amherst professor. The result was particularly gratifying to him.

From Orleans County, N.Y., we have reports that some orchards carefully sprayed yielded light crops, while others not sprayed produced very heavy crops. Considering these results, does it not appear that other causes beside the apple scab fungus and codling moth govern more or less the production of fruit, and that, while we are not to leave undone the spraying of our trees and vines, we must seek to determine the cause of failure where these remedies do not avail? That while the spraying is absolutely necessary to the production of perfect fruit, the location of the orchard to insure perfect drainage, not only of the soil,

but of the air as well, and its proper fertilization, are the essentials that underlie and determine the productiveness and value of the tree? I have a friend living near me who has eighty acres of orchard wherein the requirements and conditions spoken of are very fully met, with the result that he secures large crops of such superior fruit that he realizes at least fifty per cent more for it than most others.

For years past much damage and loss has been caused by the discoloration and decay of the bark on the bodies of apple trees near the ground, and the grub has been charged with the damage, but recent investigations prove that it is a specific disease, known as apple canker. Experiments seem to prove that it is the same fungus that produces the black rot of the apple, pear, and quince, as the same fungus has been found on the blighted twigs of all these different fruits.

That the disease is of a very destructive character is proven by the fact that in one orchard of forty-five acres in East Bloomfield, N.Y., but ten acres now remain. It is found to be doing serious damage in other large orchards, and much good must result from these investigations, because this disease destroys the trees at an age when they are of the most value, not attacking young thrifty trees before the bearing age is reached. Now what is the remedy? It is believed that the remedy that holds in check the black rot of the apple, pear, and quince will avail to check the disease on the tree, because it is found that orchards which have been regularly sprayed with the Bordeaux mixture are much freer from it than those not sprayed. It is found that the disease lives in the rough bark of mature trees, and by removing this bark or spraying the body and limbs thoroughly this favorite breeding place will be destroyed, and also all spores that may chance to fall upon the body and limbs. Canker spots once formed cannot be cured, but the limbs on which they are should be removed wherever practicable.

The market conditions of the season of 1898 have been of so unusual a character that we hope they may never be duplicated.

It is an old saying that in union there is strength. The massing together of bodies gives force and power. This is true in the social compact, as has been shown in the union and unity of the North and South in our late war with Spain. But when the elements so conspire as to bring the productions of such a vast

extent of country into our markets so nearly together, as was the case this past season, the result is disastrous to all concerned.

The Route Agent of the Adams Express Company informed me that on the same day that the first car of strawberries was shipped from Highland, Ulster County, they had a car from Delaware and one from Oswego, bringing the products of this vast extent of country into competition with each other, flooding the market beyond its capacity, the result being that the fruit was sold below the cost of production, and in some cases below the cost of transportation to market.

On my recent visit to Delaware in January last I was told that many berries were left on the vines and many picked that did not pay for picking. In the report of the Transportation Committee at the Delaware meeting the same problem was presented.

This problem confronts every organization and is of vital importance to every individual shipper, showing both the organization and the individual the necessity of organized effort to compel, by State law or otherwise, the transportation companies to fix a schedule of charges on the basis of actual weight and not on supposed value as at present imposed. I found the same trouble to exist in this section on my visit to Taunton last winter, and I find it everywhere when one company has the monopoly in transportation.

I will cite this instance: The Pennsylvania Railroad will carry berries from Norfolk to New York City for less money than they charge from Central Delaware to New York on the same train, because of competition at Norfolk. The charges in the Hudson Valley have been materially reduced since the building of the West Shore Railroad, which runs through the fruit section, but the same trouble, the unequal charges upon different products, still exists, a thirty-pound crate of grapes being charged more than a barrel of apples weighing one hundred and fifty pounds. An express car loaded at Highland with twenty-eight thousand pounds of grapes for Worcester and Boston paid the express company nearly $200, distance two hundred and twenty-seven miles.

The regulation of these charges is a matter which the Legislative Committee of the Eastern New York Horticultural Society is investigating, aiming to effect a reduction.

There remains one question which comes to the front every-

where, and is not yet satisfactorily answered. It is this: What system can be devised that will enable the producer to get his proper share of the market value of his fruit? As it is a well-known fact that much of the fruit sent to market is of inferior quality, does not the answer to this question rest first with the producer, requiring him to raise the standard of quality? This can be secured by more care in production and selection, which would insure higher prices, and more margin for profit, with increased demand for the product. This, with the regulation of transportation charges and commissions by organized effort and coöperation amongst those having like interests, the results of which are seen in other lines of industry, would go far toward answering the question how the producer can get his fair share of the market value of his fruit.

I want to call your attention to some of the insect enemies of our fruits as gathered from various sources:

In the season of 1897 the damage caused by the larvæ of the saw-fly in some vineyards was very serious, and the remedies used did not avail to destroy it without at the same time destroying the foliage, which led to serious apprehensions of the danger to the crop in 1898. One vineyard of Delaware grapes failed to ripen its fruit because of loss of foliage, and the vines were seriously injured. Delaware, Empire State, Ulster, Brighton, and many vines of Niagara and Worden were killed in my vineyard.

Being on our guard in 1898, we were ready for the first worms that hatched, and while they were very small sprayed them thoroughly with Bordeaux and Paris green.

The spray must be thrown on the under side of the leaf, as they are on that side. By careful attention and spraying we succeeded in preventing any damage being done by them.

The most destructive enemy of our grapes, in proportion to numbers, is the white-faced hornet, which has strong, bony jaws with which he tears open the grape, and passing from one berry to another soon ruins the cluster. Honey bees and wasps follow and complete the work by sucking the juices.

I want to call your attention to the leaf curl of the peach as embraced in notes from Professor Duggar's address at the Eastern New York Horticultural Society's meeting:

In the early spring the young shoots affected by the fungus will be noticed as being swollen toward the tips and being pale in color.

When the leaves are out from a quarter to half an inch, if they show a deeply colored reddish tinge it is an indication that the curl will be on hand the coming season. This fungus, in its vegetative state, grows entirely within the tissues of the leaf.

The preventive treatment: three sprayings, Bordeaux mixture being preferred even for the earliest treatment, on account of its sticking to the twigs and buds much better than the sulphate of copper solution. Two sprayings before the buds opened showed the best results.

Two cases were cited where a strip of trees through an orchard which had been sprayed in the winter with lime to retard buds showed no signs of curl, or, at most, very little as compared with the rest of the orchard.

During my recent visit to Delaware I learned that the most serious enemy to strawberry culture in that section was the strawberry root aphis.

I heard of one field of forty acres that it had ruined, and think it right to warn you against the danger of its introduction by getting plants from sections where it is known to exist. I place it in the same list as the Peach Yellows and San José Scale.

Discussion.

In the course of the lecture Mr. Taber remarked that the grape saw-fly is found on the under side of the leaf, and that the larvæ look like currant worms. He had had splendid clusters of the Empire State grape, which he had saved for exhibition, destroyed by white-faced hornets. They are not very abundant, but he wanted to relieve the bees from the charge of destroying grapes; bees do not and cannot cut through the skin of the grapes. They suck the juices after the grape has been cut open by the hornets or sparrows. The consensus of opinion in regard to spraying is that the early sprayings do most good.

In reply to an inquiry, the lecturer said that the strawberry root louse can only be destroyed by destroying the whole bed.

The Chairman spoke of a case where apple trees wilted, when the undoubted fact was that the ground was so water-soaked that the digestive organs of the trees were unable to assimilate enough of the diluted food to sustain it. Hubbardston apple trees on a ridge where there was drainage were not affected in that way.

We must have ground so situated as not only to afford drainage of water, but circulation of air.

Mr. Taber said that George T. Powell, on a ridge road, saw an orchard in the same wilted condition, though there seemed to be sufficient drainage. Inquiry proved that the roots were water-soaked all through the season, for there was no time when a post-hole could be dug without becoming half full of water. The food was so diluted with water as to afford no nourishment.

Thomas Harrison asked if there are not many wet hillsides.

The Chairman inquired whether there was a clay subsoil in the ground referred to by Mr. Taber.

Mr. Taber replied that the ground referred to was a limestone soil, which ought to afford good drainage. But however high on a hill an orchard may be, if there is still higher land above it the soil may be too wet. You do not have to dig a well so deep on a hillside as in the valley. He lives on a hill in Poughkeepsie which is full of water; a well on the hill sixty feet deep always has forty feet of water.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 11, 1899.

A meeting for Lecture and Discussion was holden at eleven o'clock today, the President, FRANCIS H. APPLETON, in the chair.

The following lecture was delivered:

MARKET GARDENING.

By HERBERT W. COLLINGWOOD, New York, N.Y.

I hardly feel that it is possible for me to give words of advice to the market gardeners of Massachusetts. The methods that we follow at home on our little place will hardly appeal to expert market gardeners, who conduct large operations with abundant credit or capital. I have only a small story of a very small enterprise, and I shall simply try to tell my story in a few words, and let others build theories on it, if they care to do so. I have observed a tendency among older farmers and market gardeners to find fault with young men today, because they complain that farming is not as profitable as it was thirty or forty years ago. Most

of our wealthy Eastern farmers either made their money while high prices were obtained for crops during the war, or else the bulk of their money was made at mechanical work of some character, performed during the winter, so as not to interfere with farm operations. All this has changed today. The younger man finds himself face to face with very different situations. His prices have been cut in two, while the facilities for flooding his markets with products from distant points have been more than doubled. The competition is greater both on the farm and in the market. The land is less productive; in fact, the situation today before the young market gardener is, at first sight, far more serious than the situation which his father was called upon to face. I want to speak to these younger men, and more particularly to the young men in town and city, with small capital, who feel today the pinch that is coming from the grasp which the great monopolies have secured on industry. These great corporations are crushing out competition, and that means the discharge of thousands who will find it difficult to make a respectable living in town. What are they to do? From my experience, I can fairly say that the best opening before such men lies in the country on cheap land, made cheap because those who destroyed its character did not understand its possibilities. I can tell you that it is a great thing to be able to say, "I have saved a farm; I have given character and value to a despised and rejected piece of ground." That is the story I come to tell this morning, and yet I cannot stand up here and take the whole credit, for my friends — chemicals, cow peas, and Crimson clover — have done most of the work.

We were driven out into the country on to the soil. We found the farm the only place where one of moderate means can take care of a large family profitably. It came about that our family was filled up with people willing to work, yet without capital either of money or skill that would enable them to work alone to advantage. After looking the matter over carefully, I became convinced that poor land, or what classes as poor with the average farmer, reasonably convenient of access to the town, is the best place for poor men. Out of the poverty of the man riches may come to the land. I observe that in New York City, business men are not running away from the Battery for new building places: they simply put up twenty stories on the site of the old five-story building. They do not run miles away after cheaper

land on which to place a building of average height: they increase the capacity of the old lot. I can remember the time when it was thought necessary for a New England man to run west of the Alleghanies after a farm. I believe that now this is wrong. The man hunting for a home may imitate the business men, by getting hold of cheap, poor land near a town, and by mechanical means increasing its capacity for crop production. I have become convinced from my own experience that while cow peas and clover seed can be bought at a reasonable figure the man with moderate capital makes a mistake in running away from New England after a farm home.

In our own case we started too late in the season to buy or rent a good farm. The desirable pieces of land are always taken up early. With us in New Jersey one great standard of value in a farm is the amount of sod which it contains. Both landlord and tenant recognize the value of grass. They understand that one can grow a fair crop of almost anything by merely plowing under a thick sod. Under ordinary conditions a farm thickly set with grass will rent for twice as much as a farm on which tenants have plowed under all the sod. My judgment is that a poor man will do best to buy land which contains no sod, because such land is usually considered by the owner as of little value; that is, because most owners think it takes three or four years to obtain a heavy sod. One of the items of knowledge that becomes power to the poor man is the fact that with clover and cow peas one can produce this sod in six months and, after the first year, without interfering with other crops. Our farm was most unpromising as a market garden. For twelve years tenant after tenant had lived on it, taking what character the soil possessed out of it, and losing their own character as good farmers. The soil was light and thin, containing little besides weed seed and a bad reputation. This reputation, however, cut the rent far below the earning possibilities of the soil. We made a resolution that we would buy no stable manure, but that the farm must feed itself, except for the chemical fertilizers which we proposed using. In other words, the problem was to restore that soil to fertility by using high-class chemicals and green crops as manure.

The first year's crop did not pay. The fact must be stated right here that it is never fair to take one single year of farmin or gardening as a standard of what the land will do. Farming is a

business of a series of years, and it would not be fair to take any single year as a basis for figuring. We got the land well on the road to recovery, and we got our small fruits started, but we tried to raise too many crops. What with potatoes, sweet corn, tomatoes, melons, cabbages, and squashes, and half a dozen other things we had but small lots of everything. We have since learned the practice of raising enough small fruits, and keeping enough hens to pay our running expenses. Then, aside from that, a large crop of potatoes or sweet corn will give us a chance to handle the market better and bunch our work into a wholesale crop.

To hear some of the fertilizer dealers talk one would think that the fertility question may be settled by simply using large quantities of chemical fertilizer. Our experience shows that there are two sides to this matter. On that soil, no matter how heavily the fertilizers were used, we did not obtain more than a fair crop. We became satisfied that that soil required both lime and humus or organic matter in order that the fertilizers could give a good account of themselves. On light, open soils I have noticed that the organic matter quickly disappears or burns out. It is necessary to keep such soil well filled with organic matter in order to produce full crops. Our neighbors told us that we could not farm without manure. In one sense they were right, and yet they were wrong. That soil needed organic matter, but it was not necessary to use the dung of animals in order to produce crops. Most of our market gardeners import large quantities of stable manure from New York. When you come to think of it, their farms are fed from the West. The hay eaten by the New York horses may come from Ohio; the grain with which they are fed may come from Illinois and Wisconsin, and the straw with which they are bedded frequently comes from Iowa; in other words, our market gardeners are importing plant food from the Mississippi Valley in the form of stable manure. Now, the way we produce crops is different. Instead of going to the West for organic matter, we produce it in the same field in which the crop is grown. A summer crop is grown between frost and frost. After that leaves the ground a manure crop occupies the soil until it is time to put in another summer crop.

After a good deal of experimenting we have found that in nine cases out of ten the Early Black cow pea and Crimson clover will

make more manure for us than any other plants. The cow pea is sown on the higher and poorer parts of the farm. In any farm rotation there is a time when the soil is poorer than in other years. In most rotations the fertilizer or the manure is crowded upon one crop, and this heavy feeding is expected to produce the crops that follow. Where a man can buy a large farm at a low price he may take the lower and richer part for his truck and small fruit. Back on the hills he may make a short rotation of cow peas and corn, or cow peas and potatoes. One year this back land may be given entirely to cow peas, which are very easily grown. The land may be plowed or worked up with a Cutaway harrow and the cow peas either drilled or broadcasted and covered with an Acme or spiketooth. Then a crop may be left alone until the time comes to plow it in the following spring. The vines may then be plowed under and potatoes grown, using a fair amount of fertilizer. The following year the land may come back into cow peas, and so on year after year. By using a potato planter, riding harrow, and cultivator, and a strong potato digger, a farmer with only a moderate supply of help can raise potatoes in this way at a light cost without interfering with his ordinary fruit and garden crops. My own opinion is that for the town man who expects to make a home in the country, these large farms with an acreage of idle land will prove in the end most profitable. These back hill lands may be plowed and set with winter apple trees, as a farmer's capital permits. A rotation of cow peas and potatoes may be followed among the trees, while they are growing to bearing size.

We started the use of cow peas in one corner of the farm on a poor, thin, sandy field. It was so notoriously poor that the neighbors selected it as a place for burying their dead horses. Our first work was to chop this field up with the Cutaway harrow; it was covered with briers and dried mullein stalks. We applied at the rate of three hundred pounds of kainit and five hundred pounds of basic slag per acre. The same quantity of dissolved phosphate rock would have answered as well, except that the slag contains a large amount of lime, which we find very useful on poor, thin soil that has been exhausted of organic matter. After Cutawaying this field, we broadcasted five pecks to the acre of Early Black cow peas, which were worked in with the Acme harrow; in August we cut a part of this growth and used the vines for mulching strawberries, but most of the growth was permitted to die down on the

ground. A small amount of nitrate of soda applied to the cow peas will quicken up and improve their growth, but too much nitrogen would be unprofitable. The cow pea is one of those plants that absorb nitrogen from the air. My conviction is that when you sow this crop on land that is very rich, or where you use a large amount of nitrogen in your fertilizer, the plant will, from choice, take the nitrogen out of the soil, and will not prove so valuable as a soil improver. We are now raising the second crop of sweet corn after that crop of cow peas, and there is no question in my mind that the growth of vines was fully equal to twenty loads of stable manure per acre. Where the vines were worked into the ground the corn has a better color and is far better able to withstand the drought. I have noticed both in corn and potatoes that where a thick mat of cow peas was turned into the ground the crop was far better able to withstand a drought. In this respect I think green manures are superior to stable manures, as the latter appear to dry out more quickly and are not so useful for holding moisture. The objection to the cow pea is that it requires practically the whole season to make its best growth. I have, however, sown the peas after a crop of early potatoes and secured a fair growth before frost. We have also sowed the cow peas among the currants, raspberries, and other bush fruits, with very fair results. The first sharp frost, however, kills the cow pea, and in order to make it most useful it is necessary to give it an entire summer for its growth, although it may be sown after such crops as early peas or lettuce. My advice, however, would be to use the cow pea on the poorer lands of the farm. Where one has considerable idle land, it would be safe to keep one-fifth of the farm constantly in cow peas, which would be a cheap and effective way of manuring. My advice would be to use at least seventy-five per cent of the potash and the phosphoric acid on the cow-pea crop, with perhaps a small amount of nitrogen. The balance of the fertilizer I would use on the crop following the cow pea, and in my experience potatoes or sweet corn have given the best results for this purpose.

With us Crimson clover has proved a very valuable soil improver. We usually sow it in the sweet corn at the last cultivation. Seed at the rate of twelve pounds per acre is broadcasted through the standing corn, then the cultivator is used with a wide block or board hanging behind so as to scrape or level down the

soil. If possible the clover should be sown just before or just after a shower. If the conditions are right, it will come up in thirty-six hours. Its first growth is feeble and you will be likely to lose confidence in it half a dozen times before the fall is over. The first time we used it we became thoroughly disgusted with the plant; in fact, we harrowed part of it up and sowed rye in its place. In September, however, when the cooler weather came, the plant suddenly began to jump, and before long covered the ground with a thick mat of green. With us the clover has lived through the winter five years in succession. It seems to keep on growing beneath the ground even during the coldest weather. In the spring, when the growth above ground seems puny and insignificant, you will find an immense root system fully developed and of great value as a fertilizer. I would sow the seed year after year, even if I knew it would not live through the winter, for the growth it makes during the late summer and fall is, in my opinion, of much greater value than any growth of rye or ordinary winter crops could be. With a poor farm, once every fifth year in cow peas, and Crimson clover always following the sweet corn, or other early crops, there will be no need of stable manure, beyond what can be made on the average-sized farm. With fair dressings of high-grade fertilizer, in connection with the clover and cow peas, I am satisfied that poor land can be slowly but surely brought back to a high state of fertility at a profit.

Having done this, the problem comes down to a question of selecting the most profitable crops for one's locality. This year we have about an acre of strawberries, about six hundred plants each of red raspberries, blackcaps, and blackberries, which with three hundred hens will pay our running expenses. By running expenses I mean the grocery and meat bills, the feed for the stock, and the incidentals or current expenses which occur on every farm. After a good deal of study and experiment we decided that for our locality a combination of potatoes, sweet corn, and cabbages would pay us better than anything else. We have this year about fifteen acres of potatoes, ten acres of sweet corn, and plan to turn out about twenty thousand head of cabbages. Two men with an occasional boy's help will do this work. Potatoes are our main crop, and we use a combination of potato-growing tools which give but little hand labor. We plant with a potato planter, and ride on the harrow, the cultivator, and the digger.

With this combination, and, in addition, a bicycle weeder and a sulky plow, two one-legged men could plant and care for thirty acres of potatoes, and produce a fair crop. The "man with the hoe" has, in my opinion, seen his best days in this class of farming. Today, in order to compete with the West, we must adopt many Western methods. I think the potato growing of the future will be largely on the back fields, with the short rotation of cow peas and potatoes which I have mentioned, and with a full set of potato-growing machinery. This is one reason why I think the young man from the town buying a poor farm will do better to go a little farther into the country and buy a large farm where there is a good deal of idle land. His profit will be made by harnessing those idle fields with the cow-pea vines, and putting them to work. The poultry, small fruits, and truck business can be crowded upon the lower and level part of the farm. We raise a large acreage of early potatoes, having found that, one year with another, the early varieties bring more money than the late ones. This is because there is less competition with the early crop. The only competition with earlies is from the territory that lies south of us. For late potatoes, the entire West and North become our competitors. Again, after growing a crop of very early potatoes, the ground may be worked up at once and drilled to cow peas. These cow peas should be cultivated the same as beans or corn, and at the last cultivation Crimson clover seed may be sown exactly as it would be in the corn crop. If the weather is wet enough the clover seed will sprout and grow after the cow peas are killed by the frost, thus giving us a humus crop for the next year, or by transplanting our late cabbage plants twice we may finally put them in the soil left by the early potatoes, and in this way produce two crops from the land. With us, the earliest sweet corn pays best, as we usually grow it on the lightest part of the farm, and thus push it along early. The bulk of our crop consists of Crosby and Perry's Hybrid, with a small proportion of Evergreen for the late market. We use horse tools as far as possible in caring for our crops, beginning with the weeder and following with a two-horse cultivator. The ground is kept thoroughly stirred and we do not find much occasion for using the hoe. Strawberries with us have not proved very profitable except for a small local trade. As I have said, the small fruit and the eggs keep us running, while potatoes, corn, and cabbages are

expected to do the heavy work. This system of farming or gardening may not appeal to the gardeners on rich land near the towns, who command a heavier capital and produce larger crops than we do. I have no thought of instructing them in their business; in fact, I am talking to an entirely different class of men — those who are called upon to face the situation as it exists to-day. Out on the farms and hillsides that are at present idle and almost valueless, I believe there are golden chances for young men who have that best of ambitions, the desire to establish comfortable homes of their own. It requires pluck and energy and self-denial to pull away from the early home places, and cross mountains and the great rivers to carve a new home in the far West. Happily, the day has gone by when such migration is necessary. Right here in New England there are opportunities for the best efforts of the strongest men. I should count it a great privilege to be able to say, after a struggle with one of these old New England farms: "I have done something for my country; I have saved a farm. I have given character and strength to an abandoned and neglected piece of ground. I have saved a farm from the wilderness. I have saved a farm for my family; saved it to stand as the best monument that I can possibly leave behind me. I did not take rich and fertile land which asked only to be tickled with the hoe in order to make it laugh with the harvest, but *I have saved a farm;* saved it for my country; saved it for New England. I have saved a farm. I have done my duty!"

Discussion.

The lecturer said, in reply to inquiries, that he was born and brought up among small independent farmers on Cape Cod. They were crowded out by farmers with large capital who pursued scientific methods, and began to feel that there was no place for them there. He thought so himself until lately, but now his views have changed, and he believes that these small farms are the only places where a large family can be brought up safely. He had a large accession to his family, and it became a question what to do with them. He went twenty-five miles into Bergen county, N.J., hunting for a farm, and found all the desirable ones taken, but he found one where five tenants had nearly starved.

Varnum Frost asked the lecturer whether he kept a debit and credit account with his farm.

Mr. Collingwood replied that in two years the farm doubled in value, and that he supported a family of ten from it during the same time. If he had had a capital of one thousand dollars, to put half into stable manure and half into fertilizers, he could have brought up his farm much more rapidly. His method would be of no value to a capitalist, or on rich ground. He got basic slag at a bargain; otherwise he would not have bought it. He would buy stable manure if he could get it at a very low price. His idea had been to carry on and improve his farm with very little capital. He would not say definitely that any man can do what he has done, but he means to stick to it. The boys who work on the farm are members of his own family; his brother-in-law does most of the work.

Benjamin P. Ware thought it due to the lecturer to say a few words in recognition of him. He had taken two positions: he had discarded the plow and stable manure, and the speaker thought it was not right to let such fallacies go abroad without any expression of dissent. But he has proved that a family can be supported on a poor farm. Now, however, he has come round and uses the plow and stable manure. Mr. Ware said that Crimson clover is not useful here; cow peas are. He cautioned against planting cabbages where pigs have fed off the Crimson clover; they will all be stump-footed. In answer to an inquiry by the lecturer, as to what he would plant in such a place, Mr. Ware replied that sweet corn or melons would grow there.

Mr. Collingwood said that in New Jersey, when the peach crop fails they put in melons, thinking that they will form a substitute.

Hon. Virgil C. Gilman expressed the hope that, now that we have got acquainted with Hope Farm, the notes on it in The Rural New Yorker would continue, and that they would be made fuller, and that a plan of the farm would be given. Such notes would be read with intense interest.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 18, 1899.

A meeting for Lecture and Discussion was holden today at eleven o'clock, Vice-President BENJAMIN P. WARE presiding.

Before introducing the lecturer, the Chairman remarked that

yesterday, the 17th, was the seventieth anniversary of the organization of the Society, and he then spoke as follows:

It seems fitting that the seventieth anniversary of this Society should not pass without noticing the grand results of its work since its organization. The Massachusetts Horticultural Society was formed by men who were deeply interested in promoting improvement in the beauty of flowers, in the quality of fruits and vegetables, and in beautifying our homes as well as public grounds and highways, thus becoming benefactors to mankind. How well they and those who followed them have succeeded in their efforts is shown by the wonderful improvement that has been effected in the products of our gardens and fields. Without giving details, I may say that there is scarcely a cultivated flower that has not been so changed and improved as to be hardly recognized as the same as those of seventy years ago. The same is true of the fruits and vegetables that supply our markets. While this is the earliest incorporated horticultural society in the country, it was not the first organized; there were several of earlier date that have since died of inertia. It may be too much to claim that all of the improvements above mentioned have been caused by this Society, yet through the liberal premiums paid for the best specimens exhibited at our annual and weekly shows, and the patient, persistent efforts of our members, much, very much, may be justly claimed as accomplished by this Society. Mount Auburn Cemetery took its origin from this Society, thus giving an object lesson that has manifestly shown its effects throughout the whole country, not only in beautifying cemeteries and public parks, but, by creating public sentiment, making these possible. By the foresight and good management of the fathers of this Society, the foundations were laid for the best horticultural library in this country, and for ample financial endowment sufficient, with equal good management in the future, to secure for all time the ability for continual advancement in the line of its past history. Following the example set by this Society, about two hundred similar organizations are in successful operation throughout the country. So it appears that the efforts of those few noble men, the fathers of this Society, have resulted in cumulative good to us that is measureless and priceless. They builded better than they knew. All honor to their memory.

The following lecture was delivered:

HORTICULTURE IN JAPAN.

By JOHN K. M. L. FARQUHAR, Boston.

The thoughtful horticulturist cannot have failed to note how large a portion of our ornamental trees, shrubs, vines, and flowering plants have come to us from Japan.

Among the last autumn attractions of our gardens were the unrivalled *Hydrangea paniculata grandiflora*, and the fragrant and beautiful *Clematis paniculata*, while the walls of our dwellings were radiant with the crimson and yellow foliage of the Japanese woodbine (*Ampelopsis Veitchii*).

Not only are our greenhouses during winter adorned with her camellias, spiræas, and lilies, but while the snow covers the ground, our parks and fens are enlivened with the shining cardinal berries of her drooping barberry.

Early in summer, the scarlet quince (*Pyrus Japonica*), the yellow corchorus, purple akebia, and numerous white and pink spiræas come as forerunners of an almost innumerable host of shrubs, trees, and vines, which uninterruptedly represent Japan in our floral decoration. Nor can we forget such popular things as her wonderful maples, conifers, irises, lilies, and pæonies. It was the contemplation of these facts that prompted me to visit Japan last summer.

Nagasaki, the southermost port of Japan, is of interest to horticulturists because for over two centuries it was the gateway through which the floral treasures of the country found egress.

From 1637 to 1859 the Dutch were the only western people having intercourse with the Japanese, and to the scientists associated with their settlement at Deshima we are largely indebted for the introduction of Japanese plants. Many of their introductions have been named in their honor, and thus the memories of Kaempfer, Thunberg, Siebold, and others, will live so long as mankind is interested in horticulture.

The first requisite of the visitor to Japan is a passport from the Japanese Government, and to secure this it is necessary to visit the American consul. The consulate is situated well up the southerly hills which enclose the bay, and is surrounded by a beautiful garden; in fact, it is said to be the finest consular residence in Eastern Asia. We find here extensive banks of azaleas,

clumps of *Cycas revoluta*, *Eulalia zebrina*, *Aucuba japonica*, and pink and white oleanders.

There are wistaria arbors, bamboo hedges, and a fine selection of shade trees. In a secluded corner we find a Japanese garden and hanging about the verandas, fine balls and figures of the interesting Japanese fern, *Davallia bullata*. The climate is humid, and even the stone walls soon become covered with a natural growth of ferns; chiefly *Pteris Cretica*, *P. serrulata*, and *Polypodium hastatum*.

Receiving my passport, I was impressed with one of its five warnings — that the traveller must not cut or injure any tree. I found Consul Harris an enthusiastic agriculturist, and his suggestions as to my trip were helpful.

Proceeding through the city, we encounter plant pedlers and see the dwellings decorated with pot-grown morning-glories, or cut flowers, chiefly lilies, hollyhocks, œnotheras, and the wild *Patrinia scabiosæfolia*.

Half-an-hour's ride by jinrikisha through the city and along a canal or stream overhung by cherry trees and willows brought me to the O'Suwa Temple, famous for its camphor trees. When Robert Fortune visited this place fifty years ago, as the guest of Dr. Siebold, whose residence was near by, he described these trees as being much the largest specimens of camphor he had met with. But Dr. Kaempfer had written a description of these gigantic trees when he resided at Nagasaki two hundred years ago, and at that time they were six hundred years old.

From Nagasaki I proceeded over the hills, which are terraced for the cultivation of rice and overflowed by streams from the mountains. It is usual to plant the narrow embankment around each terrace with a row of soja beans.

Ascending the higher hills, I passed through several dense forests of Japanese bamboo, a very important plant to the Japanese, and descending towards Mogi numerous patches of *Caladium esculentum*, grown for its esculent root; also the white lotus, of which the starchy rhizomes and the capsules are eaten, the latter having the flavor of almonds. Mogi is a fishing village on the bay of Shimabara, with fine specimens of *Pinus Thunbergii* around the water's edge.

Crossing the bay in a small steamer to Obama, I proceeded up the mountains on horseback to Unzen, famous for its sulphur

springs. The road or trail is a rough one, but there is no part of it without interest; among the forest trees I saw many fine camellias, while under them was a tangle of shrubs among which were *Hydrangea paniculata*, azaleas, *Rosa Wichuraiana*, and *Lonicera Japonica*. I found, too, numerous ferns — large spreading fronds of *Woodwardia Japonica*, *Nephrodium sophoroides*, and such delicate sorts as *Davallia tenuifolia*, *D. Mariesii*, and *Adiantum monochlamys;* also the climbing *Lygodium Japonicum* and rampant *Gleichenia*.

Part of the journey is over hills devoid of trees, and here, while pausing for rest, I gathered blooms of *Astilbe Japonica*, *Lilium Maximowiczi*, *Lychnis Sieboldii*, a species of *Inula*, and several varieties of *Ipomœa*.

When I entered Unzen I found I had to keep to one side of the street, the greater part of it being taken up with mats on which plums were being dried in the sun. The traveller should avoid eating fruits dried in this manner, as well as pickles which are exposed in uncovered vessels on the sidewalks; both are liable to cause cholera.

There are forty-three hot springs about Unzen, discharging clouds of sulphurous vapor into the atmosphere. One inhales sulphur with every breath. It seems to have no deleterious effect on vegetation; on the contrary, nowhere in the south of Japan is there more healthy foliage than here. While I noted the boiling hot water conducted in bamboo pipes to the various bath-houses, I thought how acceptable to some of our Boston cultivators would be a current of this blight-destroying vapor, fresh from nature's laboratory, could it be turned into our greenhouses.

Passing through the Inland Sea, with its three thousand or more islands, one cannot fail to note how many of the little islands are terraced and cultivated, while boats, with their crews collecting seaweed for fertilizer, are frequently passed. Although I had sailed through the Inland Sea twice, I desired to learn more about its islands; therefore on arriving at Kobe I sailed back by a small steamer to the sacred island Awaji.

Near Sumoto, the largest town on Awaji, I saw many pine trees with singular roots. The sandy soil out of which they are growing is evidently being gradually washed away, leaving the larger roots high in the air, until they look like, and in fact become, props supporting the trunk and branches.

The Japanese are not only close observers of nature, but skilful

imitators, and they have learned to produce pine trees with aërial roots four or five feet above the soil, and they are offered for sale in Tokio. Riding about twenty miles along the coast, I found many of the ferns previously mentioned; also *Clematis*, *Ampelopsis Veitchii*, *Arundo donax*, *Rosa Wichuraiana*, and *Clerodendron trichotomum*, the last a shrub with clusters of white and cardinal colored flowers of exquisite beauty, which unfortunately is not hardy in New England.

The staple product of Japan is rice, and there are about fourteen varieties in cultivation; some maturing in September, others in November; some requiring inundation during the whole period of growth, others only while they ear out; and lately varieties have been found which yield a good crop on dry land.

The seed is sown in April or May, and transplanted in a month or six weeks later. Where possible, the fields or plots are kept overflowed by streams from the mountains; elsewhere wells are resorted to, and it is not uncommon to see scores of well-sweeps operated by women, with a bamboo screen protecting them from the sun.

The fields are enriched chiefly by liquid applications. At the corner of each plot there is a cement cistern in which the liquid is prepared, and from which it is bailed to the rice ground and distributed by the overflowing water. When the crop is harvested, the only preparation needed for market is husking, an operation performed by treadmills, and which may be seen daily in the villages.

In the southern part of Japan a kind of indigo is grown to considerable extent, the color being developed by allowing the sap of the green leaves when picked to ferment in the sun. The leaves are spread on mats on the public streets; first, several inches deep to promote fermentation, after which they are turned over and spread in thin layers to dry. The growing crop looks like beds of spearmint.

At Kobe there is a public square with fine cherry trees, *Cycas revoluta*, and magnificent pink and white oleanders.

The pomegranate and Lagerstrœmia are among the striking ornamental trees which attract the traveller.

Not till I had reached Nara did I see the noble, sombre Cryptomerias, but there in the sacred grounds of the temples, where no one dare injure them, I found giants which had been stately trees before the famous Cryptomerias of Nikko were planted.

At Kyoto I found more horticultural work carried on than elsewhere in the south. At the suburb Arashyama there is one of the finest groups of cherry trees in Japan. Then the gardens of the Ginkakuji and Kinkakuji have for centuries been the models for gardens throughout the country. The Kinkakuji garden represents the Inland Sea, with its curious islands, rocks, and pines. The Japanese landscape gardener follows nature closely; the garden must contain no plant, shrub, or tree foreign to the scene he reproduces.

In a court of the Kinkakuji there is the most remarkable trained tree in Japan. It is in the form of a sailing junk; the hull (which is now about forty feet long and fifteen feet wide) being formed by the lower limbs, while the trunk and upper branches represent the mast and sails. This tree has been in training about three hundred and fifty years.

At Karasaki on the borders of Lake Biwa there is another remarkable pine, which is over a thousand years old. Its trunk is thirty-eight feet in diameter, and it has three hundred and eighty great horizontal branches extending from north to south nearly three hundred feet, and from east to west about two hundred and fifty feet.

Ten miles south of Kyoto are the famous tea gardens of Uji. They produce the finest teas in Japan, which often command from five to seven dollars a pound. Tea was introduced into Japan from China in A.D. 805, and the gardens of Uji have existed for about eight centuries. Two kinds are grown: a small-leaved variety which yields two pickings a year, — the first about the second week in May and the second about the end of June. The other sort, which has larger leaves, yields one crop about the middle of June. The small-leaved sort is the most esteemed, and the first picking is considered the best in flavor.

It is now well known that the color of tea depends entirely on the treatment of the leaves after being picked. If green tea is desired, they are fired immediately; while for black, they are spread out on mats or trays, the sap being allowed to ferment in the same manner as we observed practised with indigo, and then fired. The curl or twist is imparted to the leaves by turning and shaking them while in the firing pans.

Proceeding north, I stopped at Gotemba, where I saw growing wild many varieties of lilies, particularly *Lilium longiflorum* and

L. auratum. Exporters rely largely on collected bulbs of *L. auratum* for their stock. The other sorts are chiefly cultivated.

I was surprised to find that the bulbs of wild lilies were usually from a foot to two feet below the surface of the ground. They succeed admirably in the decomposed lava which forms the soil of Gotemba, as they have abundance of rain and ample drainage. Here, and also at Ofuna, there are extensive fields of *Lilium longiflorum*, *speciosum* sorts, and *auratum*. The fields are arranged so that they may be flooded or dried at will. The increase in lily-growing in Japan has been very great of late years, owing to failure by disease in both Holland and Bermuda. About two and a half millions of *Lilium longiflorum* bulbs were sent from Japan to the United States in 1898.

The greatest horticultural centre of the country is Tokyo. Mr. Veitch, of London, in his notes on Japan, has stated that the nurseries about Tokyo exceed those of Boskoop, Ghent, the bulb grounds of Holland, and the seed grounds of Erfurt and Quedlinburg combined. This is a bold statement; yet, having visited all these places, I am of opinion that it is no exaggeration. Some of the nurserymen carry miscellaneous stocks, while others are specialists.

Some nurseries are devoted to *Cycas revoluta*, which are grown as large specimens, or dwarfed by twisting and tying down the leaves. Many of the plants have small crowns grafted into the lower part of their stems, giving them curious forms; some of them are worth two hundred yen.

The morning-glory nurseries are particularly interesting. The plants are grown in pots, wall pots, or hanging baskets, and the variety of colors and forms is endless. Flowers five inches across are frequent; there are also many double-flowered sorts. The finer sorts are grown only as pot plants; they are not sown in the open ground, as with us.

Some nurseries are devoted to ornamental-leaved maples. In one I found over eighty distinct sorts.

Many travellers are most taken with the tree nurseries, where such conifers as *Pinus parvifolia*, *Pinus Thunbergii*, *Thuja obtusa nana*, and *Retinospora filifera* are dwarfed and stunted in small pots. Many of the trees seen are said to be three or four hundred years old. Ivies, several varieties of Podocarpus, and maples are also employed for dwarf cultivation. These trees, I think, will

never become popular here; the labor of caring for them is too great, and a few weeks of neglect will ruin the work of generations.

The nurseries of Tokyo are enclosed with hedges of Cryptomeria, Camellia, or Bamboo.

Between Tokyo and Yokohama the traveller is struck with the beautiful groups of pink lotus, which occur among the rice fields. At Kamakura there is quite a large pond filled with this lotus; there are also extensive beds of *Iris Kæmpferi* grown for export. Here, too, there are groups of *Chamærops excelsa* planted in clumps like forest trees.

In this region we pass through extensive orchards, the trees — apples, pears, plums, and peaches — being trained on horizontal trellises, resembling our grape-vine arbors, seven or eight feet above the ground. In consequence of this method, the fruit hangs under the foliage shaded from the sun and is always devoid of flavor and sweetness. The Japanese, too, gather their fruit before it ripens, the result being that it is impossible to obtain ripe, sweet, well-flavored fruit in the country, and the traveller, having the sour stuff daily thrust before him, ultimately acquires, as did the late Robert Fortune, a taste for it. Even muskmelons are gathered and eaten long before coming to maturity; if the people would boil them, as they do cucumbers, they doubtless would be less harmful.

The most impressive forestry in Japan is found at Nikko, the splendid Cryptomerias surrounding the temples and tombs of Nikko and lining the road to Tokyo as far down as Utsonomiya, a distance of twenty-five miles. These trees were planted in the seventeenth century, when the body of Ieyasu, the founder of the Shogun dynasty, was removed to Nikko. The daimyos were called upon to furnish a stone lantern each to light the grounds about the great ruler's tomb, and one too poor to comply offered to plant trees by the roadside to protect visitors from the sun; he accordingly planted these Cryptomerias, whose solemn grandeur, together with the fine mountain scenery and wonderful cascades, have called for the proverb, "Let no one use the word 'magnificent' till he has seen Nikko." The grandeur of the beautifully lacquered and gilded temples does not eclipse that of nature here. The mountains, the streams, and the waterfalls are indeed magnificent. At the time of my visit I found many of these mountain-

sides densely covered with the dark green foliage and bright blue blossoms of *Hydrangea vestita*, particularly the rocky sides of the canyons, where they were watered by the spray of the waterfalls.

Of the many shrubs found in these mountains, *Hydrangea paniculata* was at the time of my visit the most conspicuous, because it was in full bloom. I picked flowers of *Hydrangea vestita*, *Lycoris squamigera*, *Anemopsis macrophylla*, *Epilobium spicatum*, *Clematis apiifolia*, *Campanula punctata*, *Adenophora latifolia*, *Scabiosa Japonica*, *Lespedeza bicolor*, *Patrinia hispida*, *P. scabiosæfolia*, *P. officinalis*, *Salvia Japonica*, *Primula Japonica*, *Aster scaber*, *Veronica longifolia*, and *Commelina nudiflora*.

As I have said, Japan has given us many beautiful plants particularly adapted to our climate, that of Japan being not unlike that of New England. It is somewhat hotter in summer and not as cold in winter, with much more rainfall and considerable snow.

In the practice of horticulture generally, the people are far behind us, and the results in several branches in which they excel, as in dwarfing plants, curious grafting, and fantastic training, are unworthy of the labor bestowed.

Japan will be helpful to us in supplying lilies, irises, and pæonies, which on account of climate and cheap labor she can produce advantageously, but I do not believe she will become a serious rival to American or European nurserymen, as has been feared.

The lecture was illustrated with numerous beautiful stereopticon views, which added greatly to its interest. At the close, on motion of Joseph H. Woodford, it was voted that the thanks of the Society be presented to Mr. Farquhar for his very interesting exhibition and lecture.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 25, 1899.

A meeting for Lecture and Discussion was holden today at eleven o'clock, Vice-President BENJAMIN P. WARE presiding.

The following lecture was delivered:

Roadside Treatment: Actual and Possible.

By Mrs. F. H. Tucker, Newton.

As it was by your Forestry Committee that I was asked to speak to you today I should have preferred to speak upon some phase of forestry proper, and should have done so had I not been sure that I could bring you no phase of the subject with which you were not quite as familiar as I. Besides, I happened just at that time to be especially interested in what seemed to me some almost unconsidered features of roadside treatment, and as it is out of the abundance of the heart that the mouth is apt to speak to the best purpose, I venture to bring you this subject today. I do not come, however, mainly for the purpose of giving you information or facts which you doubtless already possess, but rather to bring you the problems and suggestions which the facts have brought to me, hoping for your aid in a practical solution. I have, in short, an axe to grind, but as it is your axe as much as mine, I trust you will pardon me for bringing it to your grindstone.

Scientific roadside treatment is closely related on the one hand to the science of forestry, and on the other to the science of good roads, but belongs to a more advanced stage of civilization than either. For as long as tree growth is regarded solely as an encumbrance to the ground, to be got rid of as fast as possible, or of value only as measured in terms of cord wood or board feet, and while roads are allowed to remain nearly or quite impassable during large portions of the year, the chief problem being how to pass through them at all, — while these conditions represent the normal standard of a community, one is plainly too far in advance of his times who calls public attention to the beauty or even tries to discuss the utility of any roadside growth. But we in Massachusetts, as well as in many other parts of the country, have passed that primitive stage where we can look with equanimity on indiscriminate destruction of trees and forests, or submit tamely to the inconveniences of bad travelling, or of no traveling at all. arising from bad roads. Many of us are also passing, or have passed, that sentimental stage where one cannot see a tree cut or cut down without a shriek of horror, and the ultra-economic stage when one cannot conscientiously enjoy a good dirt or grass-grown road because of a conviction that every road should be macadamized. No one, indeed, who has not given the subject some atten-

tion can realize the rapid strides which intelligence and common sense have made the past few years among the people at large in altering their views and their standards in respect to trees and roads. Now, with our forest and park reservations, our schools and chairs of arboriculture, and the greater or less influence of Arbor Day, our forestry associations, and the literature and general influence and information disseminated by all these forces; with our Highway Commission and the more than two hundred miles of State roads and the many more miles of first-class town and country roads due to this State object lesson and to the earnest efforts and coöperation of the League of American Wheelmen, — with all this pioneer work we are surely ready to begin what has never yet been attempted, a general systematic and artistic treatment of the roadsides, the connecting link between road-making and forestry.

There is at present apparently no science or art or system of roadside treatment. There are a few traditional notions on the subject and a body of more or less thoughtful and intelligent but haphazard opinion and practice; but this opinion and practice are so varied that it is doubtful whether any two persons who had given thought to the matter would agree on any five of the dozen or so principal points of variance.

In this discussion we shall confine ourselves almost entirely to country roadsides, noticing suburban roads and parkways only incidentally, and shall try to answer three questions:

I. What is the actual condition and treatment of our New England roadsides, and what principles, if any, underlie this treatment?

II. What constitutes — or would constitute if we had it — a treatment at once artistic and practical; in other words, in the broadest sense scientific; that is, founded on knowledge of conditions and of ends to be served and the best means of attaining those ends?

III. How may such scientific treatment be attained?

First, as to actual conditions and treatment and the principles thereof.

Without doubt the rural New England population, both as towns and as individuals, generally answer the question, "Shall we allow or encourage anything except grass to grow beside the road?" by an emphatic, "We will not." I have tried to find out the reasons

for this almost universal opposition to roadside growth, and will give you the results of my investigation:

1. *Conservatism.* — Many farmers keep the roadsides close cut for no tangible reason whatever, except that they and their neighbors and their ancestors have always regarded it as the proper thing to do. The most casual observer driving through country roads can hardly fail to be struck with what seem to be two opposite tendencies in the treatment of the roadside. One is to make a clean sweep of everything that grows. So far from planting trees or anything else, there seems to be a special spite against every scrap of vegetation, and all growth, whether a blade of grass, a daisy, a fern, raspberry, alder, or seedling oak or maple, — everything is periodically clipped as close as scythe can cut it. The other is the let-alone tendency. On roads where this prevails there is no more attempt at tree-planting than in the other case, but neither is there care or effort of any kind, and all sorts of growth flourish wildly luxuriant, — so luxuriant, indeed, as often to interfere rather seriously with the traveller's hat or carriage-top. In many parts of New England the latter tendency seems to be rapidly gaining ground in spite of the forces of conservatism. I account for this by the decay of agriculture and abandonment of many farms and consequent partial disuse of some of the roads in almost every town, and also by the fact that many farms are taken by foreigners without New England traditions in the matter.

2. *Untidiness.* — The New England love of order and tidiness led the old-time farmer to look upon roadside "bushes and weeds" as untidy, and to "clean up" the sides of the road just as his wife swept her floors and arranged the chairs in straight rows against the walls, and the conservatism just mentioned has kept him and his descendants doing the same thing ever since. A farmer who did not keep his roadsides "clean" was looked at askance as "shiftless" and more or less unthrifty, whatever redeeming traits he might display.

3. *Tramps.* — I have been told that the greatest objection to roadside shrubbery is that it harbors and encourages tramps. This cannot, however, be taken too seriously. The same objection might be made to building barns.

4. *Shade.* — Roadside trees beside cultivated fields are opposed on the ground that they shade the crops, and also because of the nourishment which they withdraw from the soil at the expense of the crops.

5. *Seeds.* — Another objection urged against roadside growth is that harmful seeds are thereby propagated which are scattered over neighboring fields, thus producing weeds which are a pest to the farmer.

6. *Insects.* — Roadside growth is opposed also as the breeding place of many insect pests injurious to crops.

7. *Grass.* — Some farmers wish to utilize their roadsides for grass, which they cut as an addition to their hay crop, and so oppose any growth which interferes with this end.

8. *Dust.* — It is objected from an æsthetic point of view that dust from the highway settles so heavily upon wayside shrubs and plants as to make them unsightly and disagreeable, whatever beauty they might otherwise possess.

9. *Cutting off View and Breeze.* — For æsthetic reasons, also, tall bushes are opposed as cutting off the view both near and distant, as well as shutting out the breeze, thus making the road hot and uncomfortable.

10. *Dampness.* — Trees and tall shrubs are discouraged by some on the ground that by their shade they prevent mud from drying, and in some localities keep the road generally damp.

11. *Drifting of Snow.* — This is by far the most serious objection raised to roadside trees and shrubs, but there is the greatest possible difference of opinion even among the most strenuous objectors as to what constitutes right or permissible conditions in the matter. The most radical declare that all trees, bushes, and plants of every kind on every road should be cut off regardless of location; others assert that only certain kinds of trees cause drifting; some that trees trimmed high do not affect drifting conditions; others that they should be trimmed low; many say that trees do no harm, but all other growth should be cut off. Some insist that any growth on the north or east side of the road is protective; others say that both sides should be kept cut or both shaded. These are but a few of the many points of dispute connected with this branch of the subject.

II. In view of all these arguments against roadside adornment our second question: What would constitute a treatment both practical and artistic? may seem rather difficult to answer. But let us first ask just what we should like to have if we could get it regardless of objections, and then see if meeting those objections might not be the very method, or one method, of obtaining our object.

And, first, the negative side, What must we *not* have? We must not have rubbish or gravel heaps beside the road. Even remote country roadsides should never be used, as is often the case, for a dumping-ground, and gravel or stone left from road-mending should be disposed of otherwise than in unsightly heaps by the roadside.

Banks from which sand, gravel, or dirt is dug for repairing the road should not, if possible to avoid it, be left in such condition as to disfigure the roadside.

Telephone poles should wherever possible be set at a sufficient distance from the road to be invisible to passers-by. This is already done to a small extent in some towns.

Fences and walls should be made as unobtrusive or otherwise as artistic as can be. Board fences are a disfigurement to the highway, besides being objectionable under certain conditions as causing snowdrifts. Many object to walls on the same account. Wire fences, — not barbed wire, — where something better can be substituted for the ugly posts, are as harmless as anything. In some places efforts are made to do away with fences altogether, leaving field and wood wholly open to the road. Artistically, this is perhaps the most desirable plan of all, though low walls, or ruined walls, often have a beauty peculiarly their own.

Poison Ivy is a pest which should nowhere be tolerated, and the carelessness which allows it to flourish in profusion on so many of our Massachusetts roadsides is a disgrace to the boasted civilization of this State. There are evils enough that no legislation can cure or even mitigate, but on this matter State laws could surely be made and enforced which should within two or three years at longest rid the country of this wholly unnecessary plague. I have never until lately heard of any reason or excuse, except apathy or inertia, for the perpetuation of such a nuisance, but it has just been suggested to me that some land owners allow it to overrun their walls and fences in order to keep trespassers off their ground. Whatever the cause, stringent measures should be taken for its extermination.

But now for the positive side, What should we like to have, if we could get just what we wanted?

First, let us have *only* our own native vegetation, including those few species, like Lombardy poplars, so closely associated with New England life and history as to seem at least adopted children of

the soil. I have seen the suggestion that our country roadsides should be planted with foreign shrubs and plants, especially some Japanese varieties. Lovely as these are, however, I should be extremely sorry to see this done. The whole world is growing too nearly alike, anyway. Let us keep what distinctive features we can and preserve at least that individuality of nature which is so dear to the heart of every true New Englander and which is nowhere else more characteristic than in the foliage and blossoms of our roadsides. But I would suggest the free use of as many beautiful foreign plants as possible along some of our suburban roads, replacing them by the native growth as suburb merges into country. This treatment if not overdone would appeal to me as especially beautiful and fitting and therefore artistic, with the foreign, artificially cultivated plants accompanying the more artificial human life and gradually giving place to the native growth along with changing environment.

And next let us have within these limits all possible variety. Our roadsides are now too often either monotonously bare or monotonously overgrown. And we should not choose, even if we could, to line every highway with endless rows of trees, or endless anything else, however beautiful in itself. Almost all our trees, shrubs, and plants are beautiful and suitable when fittingly placed, and an intelligent, artistic study of conditions would suggest that infinite variety of treatment through which our roadsides might yield perpetual because ever-varying charm. How to apply such treatment can perhaps best be suggested by considering those objections, many of them very real, which are raised against roadside growth. Just a word upon each.

Conservatism and a false standard of tidiness can, of course, best be met by showing with object lessons a more excellent way. The tramp question can be better discussed from a sociological than an arboricultural point of view.

The injury done by trees and bushes in shading crops or in robbing the soil of nourishment is often a question of location or of species. On the south side of a road, for instance, trees or bushes will not cast enough shade to be harmful upon fields on either side, and the amount of nourishment taken from crops depends largely upon the kind of trees or bushes in question. It must also be remembered that much nourishment is returned to the ground by fallen leaves. And again, when harm is actually

done in these ways it is often very small indeed or is more than made even by compensating advantages. So I should say, plant or encourage such trees and shrubs as are otherwise desirable where they will not shade crops, and such species as will not rob the soil, or choose locations where on the whole they will be more useful and beautiful than mischievous.

The number of roadside plants that really do much harm by scattering noxious seeds is comparatively small. Seeds are much more apt to be propagated in large numbers from field to roadside, but beautiful plants which really do this injury should be allowed only in places where they will do no harm, or the flowers should be cut before the seeds mature.

Insect pests ought, of course, to be everywhere and always as far as possible exterminated, even, as a last resort, by destroying the trees or shrubs on which they flourish. But as in the case of injurious seeds, the damage of this sort arising from roadside growth is small, compared with what is allowed to go on often wholly unchecked on land adjoining the highway.

Some farmers wish to cut grass from their roadsides, and in the main there is no good reason why they should not do so. For, while we should not wish to see all roadsides cut close, it is in the interest of the very variety that we are seeking, to allow some of them to be kept simply grass-grown. The chief objection against permitting them to be mowed is the unsightliness of the stubble, but as this is quickly covered by the second growth, and as in our present stage of progress insistence on more refined treatment is not yet feasible, we may well wink at these slight blemishes, especially as the farmers who care to harvest their roadsides are comparatively few.

For the disfiguring dust on roadside plants there seems to be no adequate remedy in sight. On all roads, whether dirt or macadam, paved or concreted, on the Back Bay or the Berkshire Hills, the dust fiend reigns at times almost supreme. But let us not destroy our plants or our houses because dust covers them as with a mantle, but rather let us seek the remedy, for one must somewhere sometime be found.

Tall, thick bushes and low-trimmed trees do shut out in some localities both breeze and landscape, but trees may be trimmed high, and bushes thinned or allowed to grow only in clumps wherever an unobstructed view or breeze is desirable and possible.

Luxuriant hedges of alder or willow, with or without the adornment of clematis or other vines, are often very effective for short distances, and places for them can be found where they will not interfere with the comfort or pleasure of the traveller. A chronically damp or muddy road needs more radical treatment than cutting down the trees and bushes on its sides, though too much shade is, of course, undesirable. Dampness and mud show a "springy" soil or defective drainage, and such roads should be replaced by different or better ones.

The alleged influence of trees and bushes in causing snowdrifts is, as has been said, the most serious objection to be met — almost equally serious, indeed, for the time, whether it exists in fact or chiefly in the mind of the objector. Only long and patient study of local conditions — conditions varying with every locality and often with every half-dozen rods on the same road — such study and investigation only can solve the problem. Meanwhile, there are many roads or stretches of road in every town where the snow never drifts to any extent and where roadsides can be beautified without considering this troublesome factor.

By this time it can readily be seen from even these brief observations that one seeking to foster roadside growth must necessarily employ some variety of treatment to meet varying conditions. But the roadside artist will not confine himself to the narrow suggestions of necessity. For instance, when local conditions forbid shrubbery, grass or barrenness are not the only alternatives. The roadside may be seeded for a distance in white clover with delightful effect. Farther on let the grass be filled with violets and perhaps next adorned with the delicate beauty of innocence or bluets, a much neglected flower. Blueberry bushes and sweet fern, hardhack and queen of the meadow, asters and golden-rod, buttercups and daisies, brakes and ferns, make only a beginning of the possibilities of beauty, employed separately or in such combinations as taste or the season may permit. And again; at present, when bushes are to be cut everything else goes with them, whether seedling trees or flowering plants. That is easier than to use care and selection. Now, I have seen it estimated that the cost of planting roadside trees, including care as long as needful, averages about six hundred dollars per mile. But why not sometimes utilize the spontaneous growth? Why should roadside trees *always* stand in rows rather than in groups or irregularly as they

chance to take root. By fostering the natural seedling growth with taste and discretion, might not expense sometimes be lessened and more artistic effects be produced?

It would also seem that a greater variety of trees might be used to advantage for roadside planting. The effect of different outlines and foliage, with a turn in the road or break in the landscape, is very pleasing. The objections commonly made to nut and fruit trees and to pines and other evergreens along highways are not insurmountable and might be more than counterbalanced by their advantages. In short, I believe that no one has ever yet imagined half the possibilities of beauty and variety in our native trees and shrubs and humble wayside plants — a beauty and variety to be obtained not so much by cultivation or artificial treatment of any sort as by skilful and sympathetic direction of Nature's own profusion and combinations. As in forestry, not planting but judicious cutting and pruning is the keynote of success. Let Nature produce and man direct the production. Thus, when consistent with local conditions, let some of the "cleaned up" roadsides grow in as Nature wills, and then thin out and supplement and direct according to taste. Most wayside bushes attain their growth in five or six years, and can thus be experimented on at a much less cost of time and care than trees.

All these are merely suggestions, and but a tithe of those possible to be made, the value of which only investigation and experiment can prove. And this brings us to our last question:

III. How may systematic and artistic roadside treatment be attained? When and how shall we begin to educate, and who will undertake the work of experiment and investigation? First, something may be done directly with and by the farmers. They have much more interest in the subject than might be supposed, and some are doing aggressive and even original work in this line. But most would not know what to do or how to set about it if they wished. Nearly all talk on the matter with much intelligence and respond to questions with valuable opinions and information. As a result of consultations with a number of farmers in different parts of New England I have almost wholly revised the opinions with which I began this study of conditions and methods of treatment. When farmers, as well as other people, find their own opinions sought for and prized they are much more ready to listen to those of others and to act upon them than when approached

dogmatically. For example, the beauty of roadside "brush" is almost wholly unappreciated in the country. Most farmers do not greatly object to trees that cost them no care or trouble, especially if trimmed high, and roadside plants are thought merely untidy. But bushes are regarded as wholly a nuisance. City boarders, however, have done something toward teaching the beauty of hedges or clumps of barberry, thickets of raspberry and blackberry, and rows or groupings of sumac, alder, willow, cherry, mulberry, elderberry, and many other shrubs. When it is found that such things pay they are looked at in a new light; first, perhaps, with curiosity and then with real appreciation. Many instances might be given of genuinely beautiful and educative work done by or through the influence of these boarders or summer residents, such as buying or saving strips of roadside woodland, planting or preserving trees, shrubs, and vines, and in other ways. But such results are almost infinitely small compared with what remains to learn and to do. One valuable principle is, however, illustrated; namely, that all reforms, even reform of the country itself, must proceed from the city and work outward. Moreover, trained and organized effort is necessary to produce the desired result — a treatment, that is, at once general, systematic, scientific, and beautiful. To what organization can we look? It seems to me that in this State the Massachusetts Highway Commission is the best equipped for study and investigation along these lines. They have already many miles of State road under their supervision to which they are adding other miles every year. This Commission has already nearly or quite all the authority and discretion necessary for such an undertaking in the statutes requiring it to "keep all State roads reasonably clear of brush," and to "cause suitable shade trees to be set out along said highways when feasible," and to "renew the same when necessary," besides "cutting the weeds along the roadway." The Massachusetts Forestry Association also and the Horticultural Society could find many ways to assist and advise in making our country roads beautiful without being unpractical. Village improvement societies, road commissioners, and every other agency should as far as may be act in harmony with and under the advice of the State Highway Commission, which has from its scope and equipment the best possible opportunity of making its roads object lessons for the study of conditions and for every variety of treat-

ment. No one official is of more importance in such a movement than the tree warden, especially when every town shall have that officer, and occasional conferences of all the tree wardens of the State, perhaps including the firewards, would be most valuable for comparing notes and discussing facts and methods.

But all effort, great or small, whether undertaken by individual or town or by organizations, either State or voluntary, should have for its motto, Scientific and Artistic Treatment in Accordance with Local Conditions.

Discussion.

The Chairman said that the lecturer had opened a wide field for discussion. She had answered many of the difficulties brought up when roadside improvement is urged. Farmers who have a mile of road by their land find it difficult to make both ends meet, and especially to pay their taxes. Towns would be unwilling to make appropriations for roadside improvement, because they have not been educated to it; but Mrs. Tucker would make a good missionary to educate them. In gathering autumn leaves the poison ivy should be avoided, and it ought to be eradicated. We want to create a popular sentiment in favor of roadside improvement, and there are ladies and gentlemen at this meeting who could carry home a powerful influence for its advancement.

Mrs. Tucker said that the expense of roadside improvement had been spoken of, but this would not be great. In one location that she knew of, very pleasant results were produced by planning the work systematically, and using our own native shrubs. It is not rare foreign plants that are needed, or large sums of money, so much as good taste and a desire to improve the appearance of the roadside.

O. B. Hadwen said that he had a fondness for roadside improvement, but he had changed his opinion somewhat, and now thinks that no trees should be set where there is much traffic; horses, electric-light men, and highway surveyors have no fondness for trees. He would plant his trees inside the fence, so as to retain control over them. A great variety of trees can be grown on a country road where the objections mentioned do not exist. In some country towns, from the sidewalk to the roadway there is a wide strip of grass for miles, which is cut with a lawn-mower, and one feels in passing through such a street that he is in a section of great refinement.

In Worcester, where the speaker resides, the Parks Commission have control of all street trees, and plant eight hundred a year; but they begin after a few years to show indications of neglect. They are planted seven feet from the fence. Trees weighted with ice bend over into the street and have to be cut off. People advise land owners to let the forest grow, but the speaker is coming to the conclusion that the only way is for the Commonwealth or towns to undertake it.

Mrs. Tucker wanted to say a word in favor of white pines. She knew a row of these trees, about thirty feet high, on the north side of a road, opposite the residence of the owner, and though they injure the grass somewhat, they shelter the house, and every tree has saved him a cord of wood. A wealthy man bought a strip of woodland three rods wide on each side of a road to save the trees, but was not very successful; as soon as the trees lost the support of the others the largest blew down, but the experiment may yet be successful. In a place sheltered by hills another attempt succeeded. If the expense of setting out trees is six hundred dollars per mile, it does not cost so much to preserve trees already there. Professor Fernow says that the planting tools are not so much needed.

Mr. Hadwen said that he planted a row of white pines in 1846, which are now seventy or eighty feet high, and afford good saw-logs. The ice we have had for some time past in winter has broken them badly; they are the worst of all evergreens to withstand breaking by ice, and the Norway spruce is one of the best.

James H. Bowditch was surprised that Mr. Hadwen should advocate the Norway spruce in preference to the white pine. Street trees must be trimmed up, and the beauty of the Norway spruce is destroyed the moment you trim it up. Mr. Hadwen's white pines, planted more than fifty years ago, have got through a good deal, and the speaker thought that Mr. Hadwen's objections to the white pine were answered by his own trees. Mr. Vanderbilt, at Biltmore, offers seedling white pines, four feet high and transplanted, for $10.50 per thousand.

The Chairman said that there are many country roads where it would involve great expense to do anything effectual; there are instances in his vicinity. Clematis vines growing over barberry bushes by the side of the road cover up the coarseness of the land, and become things of beauty. There are many places where the

let-alone system would be best and most beautiful, and many places where the trees and shrubs might be trimmed and improved; but who is to do it? It will require a good deal of preaching to bring about public sentiment to the improvements suggested by the lecturer.

—— Nowell agreed with Mr. Hadwen that much injury is done to trees by electric-light men, boys, etc , and said that a bill was then before the Legislature providing for the appointment of tree wardens, who should have sole charge of all trees in streets. He suggested that the audience should exercise their influence in favor of the preservation of street trees from injury.

J. W. Manning spoke of a row of white pine trees in Manchester, N.H., on the river road, about two miles below the city, in that part which was formerly Bedford. They are trimmed up, but they look well. He had something to do with planting them; he dug up small trees where a wood lot had been cut off. They were planted four or five feet inside of the owner's land for a distance of seventy-five rods. Many of them lived, and are now from twenty to forty feet high.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1899.

PART II.

BOSTON:
PRINTED FOR THE SOCIETY.
1900.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society

BUSINESS MEETING.

SATURDAY, April 1, 1899.

A duly notified stated meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The recommendation of the Executive Committee that the Society appropriate $80 for the use of the Garden Committee for the year 1898, additional to the appropriation for that year, reported to the Society at the meeting on the 4th of February, and then accepted, came up for final action and was unanimously voted.

The Executive Committee reported a recommendation that the Society appropriate $150 for the use of the Committee on Forestry and Roadside Improvement for the year 1899. The report was accepted and the appropriation was unanimously voted.

The Executive Committee recommended the election of William Salway, Superintendent of Spring Grove Cemetery, Cincinnati, Ohio, as a Corresponding Member, and he was unanimously elected.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were upon ballot duly elected:

MRS. ISABELLA STEWART GARDNER, of Boston.
GEORGE P. HAYWARD, of Roxbury.
H. R. KINNEY, of Worcester.
DR. BEN H. METCALF, of Winthrop.
HORACE H. MOSES, of Roxbury.
MICHAEL SULLIVAN, of Revere.

Joseph H. Woodford, at the request of the Committee on Plants, announced the decease of Azell C. Bowditch, Chairman of that Committee, and moved the election of William Wallace Lunt as Chairman, and Mr. Lunt was unanimously elected.

Mr. Woodford further moved that the Committee on Plants be empowered to select a member to fill the vacancy in the Committee and report the same to the Society, and this vote also was passed.

Mr. Woodford brought up the subject of the selection of a site for a new building for the Society, and advocated the purchase of a lot on the corner of Huntington Avenue and Oxford Terrace, explaining his views by the aid of a plan of the locality. The subject was discussed by Benjamin P. Ware, William E. Endicott, and Rev. Calvin Terry, and President Appleton made a statement explanatory of the subject.

Mr. Woodford moved that the selection of a site be left to the Executive Committee.

George D. Moore moved as an amendment that the Committee on Building take into consideration rebuilding on the present site and the purchase of land in the rear.

Pending the discussion of these motions, the Society, on motion of Benjamin C. Clark,

Adjourned to Saturday, May 6.

BUSINESS MEETING.

SATURDAY, April 22, 1899.

A special meeting of the Massachusetts Horticultural Society was holden at ten o'clock today, in accordance with the following request:

BOSTON, April 12, 1899.

Francis H. Appleton, Esq.,
President of the Massachusetts
Horticultural Society, Boston, Mass.

DEAR SIR: The undersigned, members of the Society, respectfully petition that a meeting be called at as early a date as is practicable, to listen to a report of the Finance and Executive

Committees, and to see whether the Society will authorize and direct the Finance Committee to purchase the lot of land on the corner of Huntington and Massachusetts Avenues, and extending to Falmouth Street, opposite the new Music Hall, and to authorize the President to appoint a committee of five with power to erect a new horticultural building thereon; also to authorize the Finance Committee to mortgage any of the Society's property in order to complete the purchase of said new lot of land, and the erection of said new horticultural building; and to authorize the Finance Committee to sell or improve the Society's real estate on Tremont Street as the said Finance Committee shall deem best; and to take any further action that may be necessary.

WALTER HUNNEWELL,	FRANCIS H. APPLETON,
CHARLES W. PARKER,	H. H. HUNNEWELL,
CHARLES S. SARGENT,	WILLIAM C. STRONG,
HENRY P. WALCOTT,	WILLIAM H. SPOONER,
SOLOMON LINCOLN,	NATHANIEL T. KIDDER,
C. E. RICHARDSON,	BENJAMIN C. CLARK,
BENJAMIN M. WATSON,	CHARLES F. CURTIS,

AUGUSTUS HEMENWAY.

In compliance with this request, agreeably to Section XII of the Constitution and By-Laws, the following notice was sent to every member of the Society:

MASSACHUSETTS HORTICULTURAL SOCIETY,

BOSTON, April 12, 1899.

Pursuant to the provisions of the Constitution and By-Laws, at the request of twelve members of the Society, the President hereby calls a special meeting of the Society, to be held at Horticultural Hall, 101 Tremont Street, Boston, on Saturday, the twenty-second day of April, 1899, at ten o'clock in the morning, to listen to a report of the Finance and Executive Committees, and to see whether the Society will authorize and direct the Finance Committee to purchase the lot of land on the corner of Huntington and Massachusetts Avenues and extending to Falmouth Street, opposite the new Music Hall, and to authorize the President to appoint a committee of five with power to erect a new horticultural building thereon; also to authorize the Finance Committee to mortgage any of the Society's property in order to

complete the purchase of said new lot of land and the erection of said new horticultural building; and to authorize the Finance Committee to sell or improve the Society's real estate on Tremont Street, as the said Finance Committee shall deem best; and to take any further action that may be necessary.

FRANCIS H. APPLETON,
President Massachusetts Horticultural Society.

ROBERT MANNING,
Secretary.

At this meeting the President was in the Chair. The call for the meeting was read by the Secretary.

Benjamin C. Clark introduced the subject by speaking in favor of the purchase of land on the corner of Huntington and Massachusetts Avenues as recommended by the Finance and Executive Committees.

Col. Solomon Lincoln moved the adoption of the following votes, and spoke in support of his motion:

Voted, That the Finance Committee be authorized to purchase, at such price as may seem to them suitable, the lot of land at the corner of Massachusetts and Huntington Avenues, in this city, comprising about twenty-two thousand five hundred square feet, for the use of the Society.

Voted, That the Finance Committee be authorized to sell or improve the Society's real estate on Tremont Street as the said Finance Committee shall deem for the best interests of the Society, and to mortgage any of the Society's property for such purposes, or in order to carry out the vote of the Society to purchase a piece of land at the corner of Massachusetts and Huntington Avenues.

Voted, That the President shall appoint a committee of five members, of which he shall be the chairman, with full powers to erect a building at the corner of Massachusetts and Huntington Avenues for the use of the Society at a cost not exceeding two hundred and twenty-five thousand dollars.

On motion of J. D. W. French it was voted that the speakers be limited to five minutes except with the consent of the meeting.

It was voted that the polls be kept open from eleven o'clock to one, provided that a vote is not previously reached.

The following Committee was appointed to receive, sort, and count the votes:

BENJAMIN M. WATSON, *Chairman.*

J. ALLEN CROSBY, MISS MARY C. HEWETT,
CHARLES W. JENKS, HENRY S. ADAMS.

The polls were opened at eleven o'clock, and remained open until one o'clock. The Committee to receive, sort, and count the votes, at the close of the ballot, reported that on each vote two hundred and fifty-seven members voted in the affirmative, and seventy-seven in the negative.

The President then declared that all the votes were passed, and that the second vote was passed by an affirmative vote of more than two-thirds of the members of the Society present and voting at this meeting.

The President said that he would announce the names of the Committee provided for in the third vote through the press.

Adjourned.

BUSINESS MEETING.

SATURDAY, May 6, 1899.

An adjourned meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The President announced the following as the Building Committee appointed by him agreeably to the vote passed at the Special Meeting of the Society on the twenty-second day of April:

President FRANCIS H. APPLETON, *Chairman* (as provided in the above mentioned vote).

CHARLES F. CURTIS, CHARLES S. SARGENT,
GEORGE A. NICKERSON, WILLIAM J. STEWART.

and that the Committee had chosen William J. Stewart, Secretary, and Edmund M. Wheelwright, Architect.

William Wallace Lunt, Chairman of the Committee on Plants, reported that that Committee had selected to fill the vacancy thereon, agreeably to the vote of the Society, Robert Cameron.

The President spoke of the decease of Waldo O. Ross, formerly Chairman of the Library Committee, and Azell C. Bowditch, Chairman of the Committee on Plants, and it was voted that Committees be appointed by the Chair to prepare memorials of these members. The Chair appointed to prepare a memorial of Mr Ross, William E. Endicott, George E. Davenport, and George W. Humphrey.

And to prepare a memorial of Mr. Bowditch, William Wallace Lunt, C. H. B. Breck, and Arthur H. Fewkes.

The Secretary announced the decease on the 19th of March, in his eighty-fourth year, of Charles Naudin, Director of the Experimental Garden at the Villa Thuret, Antibes, France, one of the most distinguished gardener-botanists of our times, of whom the "Gardeners' Chronicle" said that "though to the rank and file of gardeners his name might not be familiar, those concerned with the problems of systematic botany, hybridization, experimental cultivation, and the acclimatization and distribution of economic plants, would recognize that a mighty leader had fallen." He was elected a Corresponding Member of this Society in 1887, and several of his works are in the Library. The Secretary did not propose any action in regard to the death of M. Naudin, but thought it due to the Society that the departure of so eminent a member should not pass unnoticed.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

MARSHALL K. ABBOTT, of Hamilton.
MISS MARY S. AMES, of North Easton.
OLIVER AMES, of North Easton.
REBECCA C. AMES, of North Easton.
CHARLES W. AMORY, of Boston.
GEORGE H. BALL, of Boston.
WALTER C. BAYLIES, of Taunton.
ALBERT S. BIGELOW, of Cohasset.
JOSEPH S. BIGELOW, of Cohasset.
DR. WILLIAM STURGIS BIGELOW, of Boston.
T. DENNIE BOARDMAN, of Boston.
LAWRENCE BROOKS, of Groton.
PETER C. BROOKS, of Boston and Medford.

SHEPHERD BROOKS, of Medford.
JOHN A. BURNHAM, of Manchester.
ELIOT C. CLARKE, of Boston.
HON. GEORGE G. CROCKER, of Boston.
CHARLES P. CURTIS, of Swampscott.
EDWARD L. DAVIS, of Boston and Worcester.
GEORGE DEXTER, of Beverly.
JAMES L. DUNCAN, of Chelsea.
WILLIAM A. GASTON, of Boston.
EDWARD S. GREW, of Boston.
WILLIAM HOOPER, of Boston.
HORATIO A. LAMB, of Milton.
GEORGE C. LEE, of Newton (Chestnut Hill).
ABBOTT LAWRENCE LOWELL, of Boston.
CHARLES MERRIAM, of Boston.
JOHN T. MORSE, Jr., of Boston.
HENRY PARKMAN, of Boston.
S. ENDICOTT PEABODY, of Salem.
ELISHA N. PIERCE, of Waltham.
ALEXANDER S. PORTER, of Boston.
RICHARD M. SALTONSTALL, of Newton.
MISS EMILY E. SEARS, of Boston.
DR. HENRY F. SEARS, of Boston.
FRANCIS SHAW, of Wayland.
JOHN ELIOT THAYER, of South Lancaster.
WILLIAM WARREN VAUGHAN, of Boston.
SAMUEL D. WARREN, of Dedham.
EDMUND M. WHEELWRIGHT, of Boston.

Adjourned to Saturday, June 3.

BUSINESS MEETING.

SATURDAY, June 3, 1899.

An adjourned meeting of the Society was holden at eleven o'clock today, the President, FRANCIS H. APPLETON, in the chair.

William Wallace Lunt, Chairman of the Committee appointed at

the last meeting to prepare a memorial of Azell C. Bowditch, reported the following;

Whereas, God, who doeth all things well, has called from among us our late associate, Azell Carter Bowditch, and

Whereas, In the death of Mr. Bowditch we have lost an able counsellor, an upright judge, and one who has endeared himself to all who have had occasion to make exhibits before the several committees of which he was a valued member.

Resolved, That we hereby express our deep sense of the loss of one of the oldest members of the Society, who inherited from his father, also a member of the Society, a love of horticulture, and who for half a century has labored earnestly for its welfare.

Resolved, That we tender our sincere sympathy to his family in their bereavement.

Resolved, That these resolutions be spread upon the records of the Society, and that a copy of them be sent to the family of the deceased.

WM. WALLACE LUNT,
C. H. B. BRECK,
A. H. FEWKES,
} *Committee.*

The memorial was unanimously adopted.

George E. Davenport, from the Committee appointed at the last meeting to prepare a memorial of Waldo O. Ross, presented the following:

It is with feelings of the deepest regret that we find ourselves called upon to record the death of so valuable a member of this Society as Mr. Waldo O. Ross, who passed away on the 27th of December, 1898, after a brief illness which cut him off from a career of usefulness in the very prime of a splendid manhood. As a member of the Library Committee during the years 1875 to 1878, inclusive, in the last two of which he was chairman, Mr. Ross served this Society well, and his gift to the Library of a fine set of "Nature" attests the character and value of his membership.

Always in touch with the best interests of this Society, and ever ready to serve it to the best of his ability, his loss is greatly to be deplored, while the superb character of his personality and the unaffected simplicity of his manners, which endeared him to all who came in contact with him, make his loss all the greater.

Wherefore, in testimony of the esteem in which he was held by this Society, we place these resolutions on record, and tender a copy of the same to the family of our late brother member.

GEORGE E. DAVENPORT,
For the Committee.

This memorial also was unanimously adopted.

The Secretary announced the decease, on the 11th of May, of Malcolm Dunn, head gardener to the Duke of Buccleuch, at Dalkeith, Scotland, who took this position in 1871, after serving in some of the most noted gardens in England, Scotland, and Ireland, and who, succeeding to such great gardeners as Charles McIntosh and William Thomson, sustained the high level of their reputation at Dalkeith, and the fame of the garden. As a landscape gardener he possessed a good taste and he had also a knowledge of plants and their adaptation to given localities; as a pomologist he had an extensive knowledge of varieties, and his labors in the Caledonian Horticultural Society, the Scottish Horticultural Association, and the Scottish Arboricultural Society, were of the highest importance. He was elected a Corresponding Member of this Society in 1891.

The President announced that John G. Jack had resigned his membership of the Committee on Forestry and Roadside Improvement, and James Sturgis Pray was elected to fill the vacancy.

George E. Davenport, of the Committee on School Gardens, Children's Herbariums, etc., asked for an additional appropriation of $50 for gratuities for native plants. This appropriation was, agreeably to the Constitution and By-Laws, referred to the Executive Committee.

The following named persons, having been recommended by the Executive Committee as Life Members of the Society, were upon ballot duly elected:

SAMUEL N. BROWN, of Boston.
T. JEFFERSON COOLIDGE, JR., of Boston and Manchester.
L. SHANNON DAVIS, of Brookline.
WILLIAM AMORY GARDNER, of Groton.
SAMUEL HENSHAW, of Cambridge.
WILLIAM A. JEFFRIES, of Boston.
DAVID P. KIMBALL, of Boston.

Rt. Rev. William Lawrence, of Boston.
Arthur Lord, of Plymouth.
Charles S. Minot, of Boston.
Col. Charles Pfaff, of South Framingham.
Gen. Stephen M. Weld, of Dedham.

The meeting was then dissolved.

BUSINESS MEETING.

Saturday, July 1, 1899.

A duly notified stated meeting of the Society was holden today at eleven o'clock, the President, Francis H. Appleton, in the chair.

Leverett M. Chase moved that the subject of placing mural tablets on the walls of the building to be erected for the Society, to be inscribed with the names of eminent horticulturists, be referred to the Building Committee. The motion was carried.

Adjourned to Saturday, August 5.

BUSINESS MEETING.

Saturday, August 5, 1899.

An adjourned meeting of the Society was holden today at eleven o'clock, the President, Francis H. Appleton, in the chair.

Agreeably to the Constitution and By-Laws, the President appointed the following named members a Committee to nominate candidates for Officers and Standing Committees for the year 1900:

Henry Parkman, *Chairman*.

Patrick Norton.	Herbert Merriam.
Charles W. Jenks.	John Lawrence.
George A. Nickerson.	Warren H. Heustis.

Ex-President William C. Strong spoke of the meeting of the American Pomological Society, at Philadelphia, on the 7th and 8th of September, at which the Semi-Centennial Anniversary will be

celebrated, and moved that a delegation be appointed to represent the Society at that meeting. The following named members were accordingly appointed:

The President, FRANCIS H. APPLETON, *Chairman.*

WILLIAM C. STRONG,	THOMAS C. THURLOW,
WILLIAM H. SPOONER,	EDWARD B. WILDER,
BENJAMIN G. SMITH,	HON. AARON LOW,
ROBERT MANNING,	CHARLES B. TRAVIS,
SAMUEL B. PARSONS,	E. W. WOOD,
BENJAMIN P. WARE,	CHARLES F. CURTIS,
LEVERETT M. CHASE,	O. B. HADWEN,
JAMES H. CLAPP,	WARREN FENNO,
JACOB W. MANNING,	J. WILLARD HILL,
C. C. SHAW,	SUMNER COOLIDGE,
WILLIAM M. MUNSON,	SAMUEL HARTWELL.

It was voted that the delegation have power to add to their number, and that persons desiring to attend the meeting be requested to hand in their names to the Secretary.

Adjourned to Saturday, September 2.

BUSINESS MEETING.

SATURDAY, September 2, 1899.

An adjourned meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The Committee to nominate candidates for Officers and Standing Committees for the next year reported a printed list, which was accepted, and the Committee was continued and requested to nominate candidates in place of any who might decline before the election.

A communication from the Forestry Division of the United States Department of Agriculture, asking information as to what has been done here in the interests of Forestry, was referred to the Committee on Forestry and Roadside Improvement. Communications from the same source, relating to the exhibition of fruit

and other articles at the Paris Exposition of 1900, were referred to the Executive Committee.

A communication from the American Rose Society was laid on the table for the information of members.

William C. Strong announced the arrangements for delegates to the twenty-sixth session of the American Pomological Society at Philadelphia on the 7th and 8th instant.

The President announced the decease of Benjamin G. Smith, and it was voted that a committee of three be appointed by the Chair to prepare a memorial. The Chair appointed as that Committee, Benjamin C. Clark, Theodore H. Tyndale, and Benjamin P. Ware.

The Secretary announced the decease of Henri Leveque de Vilmorin, of Paris, a Corresponding Member of the Society, and the head of the great seed house of Vilmorin, Andrieux, et Cie., founded more than a hundred and fifty years ago. M. Vilmorin's great-grandfather became the head of the firm in 1781. M. Henri Vilmorin was the founder of the Society of French Agriculturists; in 1889 he was elected President of the Botanical Society of France, and at the time of his death was the premier Vice-President of the National Horticultural Society of France. He was the best known figure among the horticulturists of France, and the recognized chief authority on horticulture in that country. He made two visits to this country, when we have had the pleasure of welcoming him to these rooms. He was elected a Corresponding Member of this Society in 1887.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

Mrs. Charles Francis Adams, of South Lincoln.
F. L. Ames, of North Easton.
John Ames, of North Easton.
Francis Bartlett, of Boston and Beverly.
William Carver Bates, of Newton.
Miss Anne Blake, of Brookline.
Mrs. Arthur W. Blake, of Brookline.
John M. Brown, of Belmont.
Arthur T. Cabot, M. D., of Boston.

ZENAS CRANE, of Dalton.
CHARLES H. DALTON, of Boston and Beverly.
GEORGE A. DRAPER, of Hopedale.
WILLIAM C. ENDICOTT, JR., of Danvers.
H. H. FAY, of Wood's Holl.
JOSEPH S. FAY, JR., of Wood's Holl.
L. CARTERET FENNO, of Boston.
DANIEL S. FORD, of Weston.
CHARLES H. W. FOSTER, of Brookline and Marblehead.
JOHN L. GARDNER, of Boston.
JACKSON E. HALL, of Roxbury.
EDWIN B. HASKELL, of Auburndale.
MRS. AUGUSTUS HEMENWAY, of Canton.
COL. CHARLES A. HOPKINS, of Brookline.
GEORGE ABBOT JAMES, of Nahant.
D. WEBSTER KING, of Boston.
JOHN MASON LITTLE, of Boston and Swampscott.
AUGUSTUS P. LORING, of Boston and Pride's Crossing.
MRS. WILLIAM CALEB LORING, of Pride's Crossing.
WILLIAM MORRISON, of Cohasset.
MRS. DAVID NEVINS, of Methuen.
MRS. GEORGE A. NICKERSON, of Dedham.
G. A. PEABODY, of Danvers.
MISS MARION W. PEIRCE, of Topsfield.
COL. ALBERT A. POPE, of Boston and Cohasset.
JAMES M. PRENDERGAST, of Boston.
GEORGE PUTNAM, of Manchester.
HENRY R. REED, of Jamaica Plain.
ELIZABETH P. ROGERS, of Peabody.
JACOB C. ROGERS, of Peabody.
MRS. CHARLES S. SARGENT, of Brookline.
WILLIAM H. SHERMAN, of Brookline.
CHARLES D. SIAS, of Wenham.
FRANCIS SKINNER, JR., of Boston.
SAMUEL T. SNOW, of Boston and Cohasset.
COL. WILLIAM D. SOHIER, of Beverly.
HON. MOSES T. STEVENS, of Andover.
MRS. NATHANIEL THAYER, of Lancaster.
HERMANN THIEMANN, of Manchester.
GEORGE R. WHITE, of Boston.

The meeting was then dissolved.

BUSINESS MEETING.

SATURDAY, October 7, 1899.

A Stated Meeting of the Massachusetts Horticultural Society was holden today at eleven o'clock, being the Annual Meeting for the choice of Officers and Standing Committees, Vice-President Benjamin P. Ware presiding.

The Secretary stated that the meeting had been duly notified to the members of the Society, agreeably to the Constitution and By-Laws.

The following Memorial of Benjamin G. Smith, prepared by a Committee appointed for that purpose at the last meeting of the Society, was read by Benjamin C. Clark, Chairman, and unanimously adopted by a rising vote:

MEMORIAL OF BENJAMIN GREEN SMITH.

Benjamin Green Smith was born in Boston, October 1, 1816, graduated from the Boston English High School in the class of 1830, and died in Cambridge, August 23, 1899, leaving a widow, the daughter of Moses Warren, and one daughter, to mourn an exceptionally devoted and affectionate husband and father.

Mr. Smith retired from business many years ago, his health at that time being in a precarious condition, and he had the rare privilege of realizing fully the dream of his early life, which was the opportunity to engage in scientific and practical horticulture.

His ambition was to grow every variety of fruits and flowers. He had one hundred varieties of Hybrid Perpetual roses. Nothing was too difficult for him to attempt. It was deemed impossible to cultivate the high-bush blueberry, yet Mr. Smith studied the natural conditions of the fruit and energetically undertook what proved to be a great success.

Among his specialties were hardy grapes, of which he had more than sixty varieties. He also raised English gooseberries, currants of all kinds, pears, apples, raspberries, strawberries, and quinces in great variety. His conservatory, forcing house, and cold grapery were models.

Although to his last days interested in all the various activities of the Massachusetts Horticultural Society, of which he was Vice-

President from 1880 to 1891, inclusive, giving his time and influence freely to promote its usefulness, Mr. Smith was also greatly devoted to other associations. For many years he was Treasurer of the American Pomological Society, President of the Massachusetts Agricultural Club, Life Member of the Middlesex Agricultural Society, of the American Forestry Association, Bay State Agricultural Society, and New England Historic Genealogical Society, of the American Association for the Advancement of Science, and Local Secretary of the Audubon Society.

We make as part of this memorial the following obituary of Mr. Smith, written by one of the Committee and taken from the "Boston Transcript," of August 28:

Benjamin G. Smith.

The last summons came quietly and without pain as befitted his peaceful and serene old age. Bright and active to the last, in the full use of all his faculties, with but slight evidence of the marks of advancing years, his departure has left us bereft indeed, consoled only by the remembrance of the character of one whom it was a rare privilege to know.

Many years ago Mr. Smith left the cares and anxieties of active business life and thenceforth devoted himself to the cultivation and enjoyment of his beautiful estate in Cambridge. In this pursuit he was most successful, and it is safe to say that no man was ever more thorough in the work which he so much loved, and it is equally true that no one ever enjoyed more fully the exhibition and distribution of the products of his garden. When fruits and flowers came from his lavish hand there was always something more than their usual taste and perfume; there was the sense of a fine sentiment coming from a sympathetic and noble nature.

Mr. Smith was strongly averse to all display and ostentation. Although during his life he held many positions of honor and responsibility, he was not ambitious except in the highest and noblest sense, and he refused more offices than he ever accepted. He was a man of whom all who knew him intimately will say that if there was a kind, thoughtful, considerate act to be performed he would improve the opportunity with a rare discernment. The

most loving memory of a pure, kindly, loyal, unselfish nature is left to those who knew him best and longest.

"On earth we hear a knell —
Elsewhere there peals a bell
In welcome for a guest,
New to the wondrous quest
Whereof no man on earth
May ever know the birth."

AUGUST 26. B. C. C.

In placing upon the record of this Society its appreciation of the life, character, and services of Mr. Smith, the Secretary is requested to send a copy of this memorial to his family as an expression of our heartfelt sympathy in their bereavement.

BENJAMIN C. CLARK,
THEODORE H. TYNDALE, } *Committee.*
BENJAMIN P. WARE,

The following memorial of David Nevins, prepared by a Committee appointed for that purpose, was read by the Secretary:

MEMORIAL OF DAVID NEVINS.

In the death of David Nevins this Society and the community in which he lived have lost an enthusiastic lover of nature in whichever department he chose to take up. In the latter years of his life he devoted his leisure time to adorning his beautiful place at South Framingham with trees, shrubs, and flowers; and at frequent times entered the list of exhibitors at some of our most prominent exhibitions with very great success. Besides these successes, however, were those superior personal characteristics which every one coming in contact with him appreciated, and which will always attach to his memory the lasting sentiments of respect and esteem.

Every one receiving his hospitalities and enjoying his beautiful place will long remember the magnetic presence of a man who found his keenest enjoyment in life in sharing his own pleasures with his friends and neighbors.

Herewith we desire to place on the records of our Society our deep sense of the loss which we have sustained by his death.

N. I. BOWDITCH,
J. H. WOODFORD, } *Committee.*
J. WOODWARD MANNING,

After appropriate remarks by Ex-President William C. Strong, this memorial also was unanimously adopted by a rising vote.

The Chairman read a letter from President Appleton proposing that Section V of the Constitution and By-Laws be amended so as to permit voting by proxy. The proposed amendment was read twice and was discussed by Hon. Virgil C. Gilman, William C. Strong, Benjamin C. Clark, Patrick Norton, and Nathaniel T. Kidder. A motion to lay on the table was negatived.

The question was then put "Shall the proposed amendment be entered on the records for final action at the stated meeting in January next," and on this question the vote was unanimously in the negative.

Agreeably to the Constitution and By-Laws, the Chair appointed Hon. Aaron Low, John K. M. L. Farquhar, and Miss Mary C. Hewett a Committee to receive, assort, and count the votes given for Officers and Standing Committees, and report the number. The polls were opened at forty minutes after eleven and closed at forty minutes past one o'clock, and the Committee reported that the persons named on the ticket presented by the Nominating Committee had a plurality of votes, and were elected.

The report was accepted and the persons named on the above-mentioned ticket were, agreeably to the Constitution and By-Laws, declared by the presiding officer to have a plurality of votes, and to be elected Officers and Standing Committees of the Society for the year 1900.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were upon ballot duly elected:

James B. Ayer, M. D., of Boston.
George N. Black, of Manchester.
Mrs. John L. Bremer, of Manchester.
William B. de las Casas, of Malden.
H. E. Converse, of Malden.
J. Randolph Coolidge, of Chestnut Hill.
Mrs. J. Randolph Coolidge, of Chestnut Hill.
Charles P. Curtis, Jr., of Boston.
George B. Fessenden, of Allston.
Mrs. John C. Gray, of Boston.

Arthur E. Hartshorn, of Worcester.
Mrs. Henry S. Hunnewell, of Wellesley.
Eben D. Jordan, of Boston.
Otis H. Luke, of Brookline.
Mrs. Theodore Lyman, of Brookline.
Mrs. John C. Phillips, of North Beverly.
William Phillips, of North Beverly.
Mrs. Francis W. Sargent, of Wellesley.
Mrs. J. Montgomery Sears, of Southborough.
Mrs. Robert G. Shaw, of Wellesley.
Miss Mabel Simpkins, of Yarmouth.
Charles H. Taylor, of Boston.
Mrs. Alice R. Thayer, of Boston.
Eugene V. R. Thayer, of Lancaster.
Mrs. Eugene V. R. Thayer, of Lancaster.
Mrs. John E. Thayer, of Lancaster.
Nathaniel Thayer, of Boston.
Stephen V. R. Thayer, of Boston.
Henry M. Whitney, of Cohasset.
John Davis Williams, of Boston.
Roger Wolcott, of Milton.

Col. Henry W. Wilson presented a bean plant, grown in pure silex with the addition of soda, but without potash, and moved that the subject be referred to the Committee on Gardens, to make such experiments as they see fit, without expense to the Society. The motion was carried and the subject was so referred.

Adjourned to Saturday, November 4.

BUSINESS MEETING.

Saturday, November 4, 1899.

An adjourned meeting of the Society was holden today at eleven o'clock, the President in the chair.

The amendment to the Constitution and By-Laws, to permit voting by proxy, proposed at the meeting on the first Saturday in October, and then defeated, was brought up again on a motion made by the President to reconsider it. The legality of any action

on this subject at this time was questioned and the Chair decided that it was legal. This decision was appealed from, and on putting the question to vote the Chair was sustained.

The question on reconsidering the vote whereby the proposed amendment was refused entry on the records was then put, and was carried by a vote of Yes, 75; No. 58. A motion to postpone indefinitely was defeated.

A vote on the main question was then taken and the proposed amendment was defeated by a vote of Yes, 46; No, 50.

The President, as Chairman of the Executive Committee, reported from that Committee a recommendation that the Society appropriate the same amounts for Prizes and Gratuities for the year 1900 as for the present year, but that the sum of $136.50 be transferred from the appropriation for Prizes and Gratuities for Flowers to that to be awarded by the Committee on School Gardens and Children's Herbariums for Prizes and Gratuities for Native Plants.

The report was accepted, and, agreeably to the Constitution and By-Laws, was laid over for final action on the first Saturday in January next.

The amounts recommended are as follows:

For Prizes and Gratuities for Plants . . .	$2,000 00
" " " " " Flowers . . .	2,531 50
" " " " " Native Plants . .	186 50
" " " " " Fruits . . .	1,732 00
" " " " " Vegetables . . .	1,200 00
" " " " " Gardens . . .	500 00
Total for Prizes and Gratuities for the year 1900 .	$8,150 00

Joseph H. Woodford offered the following vote:

Voted, That the three statues on the building, the two tablets on the walls of the staircase hall, and the two boxes in the cornerstone, be reserved and re-incorporated in the new Horticultural Building about to be erected by the Society.

The vote was referred to the Building Committee.

The following named persons, having been recommended by the

Executive Committee for membership in the Society, were on ballot duly elected:

Larz Anderson, of Brookline.
William H. Derby, of Revere.
Miss Caroline Louisa Williams French, of Boston.
Z. T. Hollingsworth, of Boston and Cohasset.
Charles Lanier, of Lenox.
William E. McClintock, of Chelsea.
John E. Parsons, of Lenox.
Preston Pond, of Winchester.
Barthold Schlesinger, of Brookline.
Henry Davis Sleeper, of Boston and Marblehead Neck.
David T. Strange, of Stoneham.
W. B. Thomas, of Manchester.
Miss Ellen May Tower, of Lexington.
William Benjamin Whittier, of South Framingham.
George Wigglesworth, of Milton.
Miss Adelia Coffin Williams, of Roxbury.
Windsor H. Wyman, of North Abington.

Adjourned to Saturday, December 2.

BUSINESS MEETING.

Saturday, December 2, 1899.

An adjourned meeting of the Society was holden today at eleven o'clock, the President in the chair.

The Schedule of Prizes for the year 1900 was reported by William J. Stewart, Chairman of the Committee for Establishing Prizes, accepted, and ordered to be printed.

J. Woodward Manning, Chairman of the Committee on Flowers, presented the Annual Report of that Committee.

Warren Howard Heustis, Chairman of the Committee on Vegetables, presented the Annual Report of that Committee.

Robert Manning presented his Annual Report as Secretary and Librarian.

These reports were severally accepted and referred to the Committee on Publication.

The Chairman of the Library Committee asked further time to prepare his report, which was granted.

It was voted that when the meeting adjourns it be for two weeks, and that the Secretary notify the Chairmen of Committees who have not presented their reports, and all others from whom reports are due, of this action.

The President, as Chairman of the Building Committee, reported that the Committee had given a great deal of time to the plans for a new building, until now they meet the unanimous approval of the Committee. Two estimates of cost have been made; the first, based on the cost of materials at the time the building was authorized, showing that it could then have been built for the amount appropriated by the Society; the second estimate, made lately, is much higher, so that the Committee have decided to postpone further consideration of the subject until March.

The Secretary announced that a statement of the changes made in the Schedule of Prizes for 1900 from that of 1899 had been printed, and that copies were on the table for distribution.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

WILLIAM TRACY EUSTIS, of Brookline.
HENRY G. JORDAN, of Hingham.
ISAAC H. LOCKE, of Belmont.
MISS ELLEN F. MASON, of Boston.

Adjourned to Saturday, December 16.

BUSINESS MEETING.

SATURDAY, December 16, 1899.

An adjourned meeting of the Society was holden on Saturday at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

William Wallace Lunt, Chairman of the Committee on Plants, presented the Annual Report of that Committee.

Joseph H. Woodford, Chairman of the Committee of Arrangements, presented the Annual Report of that Committee.

Mr. Woodford also presented the Annual Report of the Committee on Gardens.

William E. Endicott, Chairman of the Library Committee, presented the Annual Report of that Committee.

Hon. Aaron Low, Chairman of the Committee on Lectures and Publication, presented the Annual Report of that Committee.

The Secretary of the Society, in behalf of the Committee on Forestry and Roadside Improvement, presented the Annual Report of that Committee.

Henry L. Clapp, Chairman of the Committee on School Gardens and Children's Herbariums, presented the Annual Report of that Committee.

The above-mentioned reports were accepted and referred to the Committee on Publication.

Further time was granted to the Fruit Committee and the Delegate to the State Board of Agriculture to prepare their reports.

The meeting was then dissolved.

REPORT

OF THE

COMMITTEE ON PLANTS,

FOR THE YEAR 1899.

By WILLIAM WALLACE LUNT, CHAIRMAN.

Your Committee present the following report with mingled feelings of pride and gratification at the excellence of the exhibitions made during the year now drawing to a close. Pride, at the number of "new and rare" plants shown before the Society for the first time, and gratification at the renewal of interest of many of the older exhibitors, who, with those of more recent date, are materially aiding your Committee in presenting a very creditable display nearly every Saturday as well as at the regular exhibitions.

At a meeting of the Committee on Establishing Prizes, held a year ago, ways and means were discussed to bring out a more extended exhibition of plants new to cultivation, such as recently discovered species, hybrids between existing kinds, etc., and a revival of the Orchid exhibits of ten or fifteen years ago, there having been a lamentable falling off in these particular classes, as well as in the class for "Groups of Docorative Plants."

Radical changes were proposed, but their advocates found themselves in a hopeless minority, and the matter was allowed to remain dormant until after the death of the late Chairman of this Committee, Azell C. Bowditch, whose long and varied experience and conservative conduct of affairs had done much to establish that prestige for which your Committee on Plants has long been noted.

Notwithstanding this, criticism, in some cases just, had been frequent, and it was to answer this criticism that the radical change, before mentioned, was, in a measure, inaugurated when your Committee, as now constituted, commenced their duties some nine months ago, the results certainly being beyond anything anticipated; there having been not less than three new Palms, fifty-five new Orchids, and seventeen new varieties of Dipladenias exhibited for the first time: this Society having the honor of recording many of them in this country and abroad.

Your Committee may, therefore, assume that their departure from some of the old-time customs, and their endeavors to keep abreast of the times in matters horticultural, have, in a measure, been successful, and that a continuance of this discriminating and liberal, *though not extravagant*, policy in the future, may bring forth equal if not better results the coming year.

It gives your Committee much pleasure to acknowledge the courtesy of Oakes Ames, in placing at their disposal for consultation and reference his unequalled records and herbarium, which have been of inestimable value in determining not a few of the varieties placed on exhibition under other than their correct names.

While there is still hope for improvement in the grouping and arrangement of exhibits, it is certain that more attention than formerly, is paid to artistic details, and this was apparent at the Spring, Rose and Strawberry, and Chrysanthemum Exhibitions.

In conclusion, your Committee would offer the following suggestions: —

1. That in future, exhibitors of groups of plants, pay more attention to correctly marking the name of each variety upon plants exhibited, for the benefit of the public.

2. That they pay more attention to properly finishing off the border of their exhibits, screening from view the lower row of pots and boxes used as plant stands, labelled with remedies for every ill that "flesh is heir to," suggesting to the disappointed exhibitor a possible balm for his wounded feelings.

3. That the proper authorities make some provision for the recognition of the untiring efforts of the gardeners who have exerted their skill and knowledge to perfect for their employers the magnificent specimen plants that are shown throughout the year at our exhibitions.

CATTLEYA × HARDYANA, Young's Var.

It may not be out of place at this time to make some mention of the weekly exhibits of James E. Rothwell (John Mutch, gardener), and H. A. Wheeler, who have done much toward making our Saturday displays interesting and successful.

And last, but not least, your Chairman would here acknowledge his personal obligations to the members of his Committee, who, though making horticulture a profession, have accorded him that generous treatment, which, as an amateur, he hardly expected, but which, on better acquaintance, he finds they willingly give to those who labor for the Goddess Flora.

Among the exhibits of rare botanical interest may be mentioned the following: —

August 5.— Display of Botanical Orchids by Oakes Ames (R. M. Grey, gardener) which were awarded Honorable Mention.

August 19.— *Cattleya Hardyana* by Oakes Ames, a most interesting variety, it having the influence of the *Dowiana* parent entirely obliterated. The Committee asked that it be shown again. It received the award of Honorable Mention.

September 9.— *Cypripedium Kimballianum*, by Oakes Ames, a supposed natural hybrid between *C. Rothschildianum* and *C. Dayanum*, awarded a First Class Certificate of Merit.

November 4.— Display of six new varieties of Anœctochilus, by William Duckham, of Madison, N. J., awarded a Silver Medal.

Among the general exhibits were the following:—

February 11.— Six varieties of *Cymbidium eburneo-Lowianum*, raised and exhibited by George McWilliam, they being of exceptional merit as an *American* production. They were awarded the Society's Gold Medal.

April 8.— *Deutzia* (hybrid) *Lemoineii*, introduced by James Comley, a pleasing improvement which was awarded a gratuity.

April 22.— *Dendrobium densiflorum*, a magnificent specimen, bearing sixteen racemes of beautiful flowers, and a remarkable example of the superior cultivation bestowed upon it by its grower, Edward Butler, who was awarded a Silver Medal.

May 6.— *Areca Ilsemanni* and *Licuala Jeanenceya*, exhibited for the first time in this country by Jason S. Bailey (William Donald, gardener) awarded a Silver Medal and First Class Certificate of Merit, respectively.

RHODODENDRON SHOW.

JUNE 7 AND 8.

Miltonia Bleuana var. *nobilor*, by H. H. Hunnewell (Frederick L. Harris, gardener) exhibited here for the first time and awarded a Silver Medal.

July 1.— *Dipladenia Boliviensis*, grown as a dwarf bedding and decorative plant, by George McWilliam, deemed worthy of a Silver Medal.

July 15.— *Linospadix Petrickiana*, by Jason S. Bailey (William Donald, gardener), first time exhibited,— a Silver Medal.

August 12.— Three specimen plants, distinct varieties of the rare *Cattleya Hardyana*, the varieties being Trenton var., Young's var., and var. Roeblingiana, exhibited by C. G. Roebling (H. T. Clinkaberry, gardener), Trenton, N. J. They were awarded the Appleton Gold, and Society's Silver and Bronze Medals, respectively. Also *Cattleya chrysotoxa*, a fine specimen of superior cultivation, by Bayard Thayer (James Brydon, gardener), a Silver Medal. Seldom have four finer varieties of Orchids been displayed at one time in the halls of this Society, and it gave an impetus to the orchid culture which has been very appreciably felt by growers in the increased demand for finer varieties.

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

AUGUST 30 AND 31.

Display of hybrid Dipladenias raised by George McWilliam, who began in 1883 to experiment with these plants, and for the past sixteen years has labored incessantly to bring to perfection the remarkable specimens exhibited, which for size and gorgeousness of color are surpassed by but few plants. They were awarded the Society's Gold Medal. There was also exhibited by E. O. Orpet, an American raised seedling *Laelia nigrescens*, a hybrid between *L. pumila* and *L. tenebrosa*, partaking strongly of the latter parent, though lighter in color. It was awarded a First Class Certificate of Merit.

September 23.— *Laelio-Cattleya* Catherine L. Whitin (*C. Harrisoniæ* × *L. purpurata*), an American seedling raised and exhibited by George McWilliam and believed to be the first plant of this cross. It was awarded a Silver Medal.

DIPLADENIA BOLIVIENSIS.

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

SEPTEMBER 28 AND 29.

Cattleya Portia (*C. Bowringiana*×*C. labiata*,) by E. O. Orpet, a pretty hybrid partaking in a marked degree of the characteristics of *C. Bowringiana*, though the flowers are larger and more intense in coloring: your Committee considered it an improvement and it was awarded a First Class Certificate of Merit.

October 21.—*Cattleya Mantinii* var. *nobilor* (*C. Bowringiana*, var. *floribunda colorata*×*C. Dowiana* var. *aurea*) by Oakes Ames —a fine richly colored hybrid showing just enough of its *Dowiana* parentage in the labellum to make it a much desired acquisition. Awarded a Silver Medal.

CHRYSANTHEMUM SHOW.

NOVEMBER 7, 8, 9 AND 10.

It is no easy task for your Committee to describe properly displays made by the several exhibitors, for where such skill is shown by all it would be manifestly unfair to give one more credit than another. The Chrysanthemum plants shown were of such excellence that the award for First Prize for twelve named plants, judged by points, was a matter of much consideration, Mrs. B. P. Cheney (John Barr, gardener), finally carrying off the prize with the following varieties:

Arethusa.	Mrs. F. A. Constable.
Charity.	Mrs. Weeks.
Iora.	Mutual Friend.
Miss G. Bramhall.	Red Warrior.
Miss Georgianna Pitcher.	Silver Cloud.
Mrs. E. B. Freeman.	The Bard.

Jason S. Bailey was a close second with:

Arethusa.	Ivory.
Black Hawk.	John Shrimpton.
Garza.	Major Bonaffon.
Golden Gate.	Miss Agnes Dalscon.
Golden Trophy.	Mutual Friend.
Iora	The Bard.

Walter Hunnewell and E. S. Converse took third and fourth prizes respectively. Mrs. B. P. Cheney also took Firsts in the following classes:

Three Japanese Incurved, Three Reflexed, Specimen Incurved, Specimen Reflexed, and Specimen Pompon.

The Botanic Garden of Harvard University made a pleasing exhibit of Begonia Gloire de Lorraine (some sixty plants being in the display) and nineteen plants of Chrysanthemums upon the stage in the Upper Hall, both adding very materially to the color effect and success of the exhibition, though not entered in competition.

Much interest was created by some pretty little Chrysanthemum plants grown to bush form by T. D. Hatfield, gardener to Walter Hunnewell, they being all that could be desired as plants for house decoration.

November 25.—*Cymbidium Winnianum* and *Cattleya Chocoensis*, var. *virginalis*, were shown for the first time here by Oakes Ames (R. M. Grey, gardener.) Each was awarded a Silver Medal.

December 25.—*Cypripedium insigne* var. *citrinum*, and *Cypripedium Deedmanianum*, (*C. Spicerianum* × *C. Chamberlainianum*) were shown by Oakes Ames, each receiving a First Class Certificate of Merit. There were also exhibits of Orchids by James E. Rothwell (J. Mutch, gardener), Mrs. J. L. Gardner (William Thatcher, gardener) and H. A. Wheeler. This exhibition being something of a twentieth century innovation, upon its success or failure depended its retention upon the Schedule in future, but for obvious reasons the Committee would recommend it be made a month later, in January.

The amount appropriated for Prizes and Gratuities during the year was	$2,000 00
Prizes and Gratuities have been awarded amounting to	1,815 00
Leaving a balance of	$185 00

out of which Medals, etc., are to be paid for.

Respectfully submitted,

WILLIAM WALLACE LUNT,
JAMES WHEELER,
WM. J. MARTIN,
ARTHUR H. FEWKES,
ROBERT CAMERON,
} *Committee on Plants.*

LAELIA x NIGRESCENS.

PRIZES AND GRATUITIES AWARDED FOR PLANTS.

1899.

January 7.

Primula Sinensis.— Six plants in not less than six-inch pots:

First, Mrs. B. P. Cheney	4 00
Second, Mrs. B. P. Cheney	3 00
Third, Mrs. John L. Gardner	2 00

Primula stellata.— Six plants in not less than six-inch pots:

First, Mrs. B. P. Cheney	3 00
Second, Mrs. John L. Gardner	2 00

Primula obconica Hybrids.— Six plants in not less than six-inch pots:

Second, Mrs. John L. Gardner	3 00

Gratuities: —

Mrs. John L. Gardner, Begonia Gloire de Lorraine	1 00
" " " " Primulas	2 00
Mrs. B. P. Cheney, "	2 00
Edward J. Mitton, *Cattleya speciosissima*	1 00

January 21.

Gratuities: —

Walter E. Coburn, Fifteen plants Primula Sinensis	3 00
James E. Rothwell, *Cypripedium signatum Calypso*	1 00
" " " " *Lucienianum superbum*	1 00

February 4.

Freesias.— Six pots or pans:

First. Charles H. Souther	5 00

Gratuities: —

Charles H. Souther, *Begonia incarnata* (improved)	2 00
Harvard Botanic Garden, Collection of Orchids and Freesias	10 00
Mrs. John L. Gardner, Display of *Primula Sinensis* and *Erica melanthera*	4 00
George McWilliam, Display of Seedling Cypripediums	2 00
H. A. Wheeler, " " Orchids	1 00

February 11.

Gratuity: —

Mrs. J. C. Whitin (William McAllister, gardener), Specimen *Dendrobium nobile*	3 00

February 18.

Gratuities: —

Edward J. Mitton, Two plants of *Cattleya Trianæ*	5 00
James E. Rothwell, *Cypripedium Leeanum*, var. *Masareelianum*	2 00

MARCH 4.

Gratuities:—

Mrs. John L. Gardner, Display of Cyclamen and Violets	5 00
James E. Rothwell, *Oncidium tigrinum*	1 00
Harvard Botanic Garden, Display of Orchids	10 00

MARCH 18.

Gratuity:

James E. Rothwell, *Sophronitis grandiflora*	1 00

SPRING EXHIBITION.

MARCH 21, 22, 23 AND 24.

Theodore Lyman Fund.

INDIAN AZALEAS.— Specimen Plant, named:	
First, Dr. C. G. Weld	10 00
Second, Dr. C. G. Weld	8 00
Third, H. A. Wheeler	5 00
ERICAS.— Six, not less than three species:	
Second, Bussey Institution	4 00

Society's Prizes.

ORCHID.— Single plant:	
First, James E. Rothwell	12 00
Second, Edward Butler	10 00
Third, Mrs. J. C. Whitin	6 00
Fourth, J. S. Bailey	4 00
STOVE OR GREENHOUSE PLANT.— Specimen in bloom other than Azalea or Orchid, named:	
First, Dr. C. G. Weld	8 00
HARDWOODED GREENHOUSE PLANTS.— Four, in bloom:	
First, Dr. C. G. Weld	10 00
Second, Dr. C. G. Weld	8 00
CLIMBING ROSE.— Specimen plant in bloom:	
First, C. H. Souther	8 00
HARDY FLOWERING DECIDUOUS SHRUBS, FORCED.— Four, of four distinct species, named:	
First, Bussey Institution	6 00
HARDY FLOWERING EVERGREEN SHRUBS, FORCED.— Four, of four distinct species, named:	
First, Bussey Institution	6 00
CANNAS.— Display, not less than ten plants, in pots:	
First, James L. Little	10 00
Second, James L. Little	8 00

HARDY PRIMROSES.— Twelve plants of distinct varieties:	
First, Dr. C. G. Weld	6 00
Second, Mrs. John L. Gardner	4 00
HARDY POLYANTHUSES.— Twelve plants of distinct varieties:	
First, Mrs. John L. Gardner	6 00
Second, Bussey Institution	4 00
CYCLAMENS.— Ten plants:	
First, Mrs. B. P. Cheney	15 00
Second, Mrs. B. P. Cheney	12 00
Third, Dr. C. G. Weld	10 00
Ten plants in not over seven-inch pots:	
First, Dr. C. G. Weld	8 00
Second, Mrs. B. P. Cheney	6 00
Third, Mrs. B. P. Cheney	4 00
Single plant:	
Second, Mrs. B. P. Cheney	4 00
Third, Mrs. B. P. Cheney	3 00
CINERARIAS.— Six varieties:	
First, James Garthley	10 00
Second, Charles H. Souther	8 00
Third, J. S. Bailey	6 00
Fourth, Mrs. John L. Gardner	5 00
Three varieties:	
First, James Garthley	6 00
Second, Mrs. John L. Gardner	5 00
Third, J. S. Bailey	4 00
Single plant:	
First, James Garthley	4 00
Second, Mrs. John L. Gardner	3 00
Third, J. S. Bailey	2 00
HYACINTHS.— Twelve named varieties in pots, one in each pot:	
First, Mrs. John L. Gardner	6 00
Second, Bussey Institution	4 00
Six named varieties in pots, one in each pot:	
First, Bussey Institution	5 00
Second, Mrs. John L. Gardner	4 00
Third, E. S. Converse	3 00
Single named bulb, in pot:	
First, Mrs. John L. Gardner	2 00
Second, Bussey Institution	1 00
Three pans, not to exceed twelve inches, ten bulbs of one variety in each pan:	
First, Dr. C. G. Weld	6 00
Second, Mrs. John L. Gardner	4 00
Third, Mrs. John L. Gardner	3 00
Two pans, not to exceed twelve inches, ten bulbs of one variety in each pan:	

First, Mrs. John L. Gardner	4 00
Second, Dr. C. G. Weld	3 00
Single pan, not to exceed twelve inches, with ten bulbs of one variety:	
First, Mrs. John L. Gardner	3 00
Second, Bussey Institution	2 00
Third, Bussey Institution	1 00
TULIPS.— Six eight-inch pans, nine bulbs of one variety in each:	
First, William S. Ewell & Son	4 00
Second, E. S. Converse	3 00
Third, Bussey Institution	2 00
Three eight-inch pans, nine bulbs of one variety in each:	
First, William S. Ewell & Son	3 00
Second, E. S. Converse	2 00
Third, Bussey Institution	1 00
Three ten-inch pans, twelve bulbs of one variety in each:	
First, William S. Ewell & Son	5 00
Second, E. S. Converse	4 00
Third, Bussey Institution	3 00
Fourth, Bussey Institution	2 00
POLYANTHUS NARCISSUS.— Four seven-inch pots, four bulbs in each, distinct varieties:	
First, Mrs. John L. Gardner	4 00
Second, Bussey Institution	3 00
JONQUILS.— Six pots or pans, not exceeding eight inches, the number of bulbs in each to be at the discretion of the grower:	
First, William S. Ewell & Son	4 00
Second, Bussey Institution	3 00
Third, Dr. C. G. Weld	2 00
NARCISSUSES.—Six eight-inch pans, distinct varieties, single or double:	
First, Dr. C. G. Weld	4 00
Second, William S. Ewell & Son	3 00
Three eight-inch pans:	
First, Dr. C. G. Weld	3 00
Second, William S. Ewell & Son	2 00
LILY OF THE VALLEY.— Six pots or pans, not exceeding eight inches:	
Second, Bussey Institution	3 00
CROCUSES.— Three boxes, each eight by twenty inches, three distinct varieties:	
First, William S. Ewell & Son	3 00
Second, Bussey Institution	2 00
FREESIAS.— Six pots or pans:	
First, Dr. C. G. Weld	3 00
ROMAN HYACINTHS.— Six eight-inch pans, ten bulbs in a pan:	
First, Bussey Institution	3 00
Second, Dr. C. G. Weld	2 00
Third, William S. Ewell & Son	1 00

General Display of Spring Bulbs.— All Classes:

First, William S. Ewell & Son	15 00
Second, Bussey Institution	12 00

Gratuities:—

E. S. Converse, Display of Cinerarias	3 00
C. H. Souther, Display of *Cineraria stellata*	3 00
Mrs. B. P. Cheney, Hybrid Roses and Cinerarias	12 00
James Garthley, Display of Cyclamens	3 00
Bussey Institution, Forced Hardy Plants and Shrubs	5 00
Edward Butler, Display of Orchids	5 00
Yamanaka & Co., Display of Japanese Plants	15 00
Mrs. John L. Gardner, Display of Hyacinths	4 00
Dr. C. G. Weld, Display of Hyacinths	2 00

April 1.

Gratuities:—

Warren Heustis & Son, *Rubus rosaefolius*	2 00
Edward Butler, *Dendrobium nobile*	4 00
H. A. Wheeler, *Dendrobium Wardianum*	1 00

April 8.

Gratuities:—

James Comley, *Deutzia hybrida Lemoinei*	5 00
James E. Rothwell, *Cypripedium Robelenii*	3 00

May 6.

Pelargoniums.— Six named Show or Fancy varieties, in not less than eight-inch pots:

First, C. H. Souther	10 00

Indian Azaleas.— Six plants in pots, named:

First, Dr. C. G. Weld	8 00

Single specimen:

First, Dr. C. G. Weld	3 00
Second, Dr. C. G. Weld	2 00

Calceolarias.— Six varieties in pots:

First, Mrs. B. P. Cheney	10 00
Second, Mrs. B. P. Cheney	8 00

Single plant:

First, Mrs. B. P. Cheney	3 00
Second, Mrs. B. P. Cheney	2 00
Third, Mrs. B. P. Cheney	1 00

Orchids.— Display, named:

First, James E. Rothwell	12 00

Amaryllises.— Six pots, distinct varieties:

First, Dr. C. G. Weld	8 00

Gratuities:—

Jason S. Bailey, *Cattleya Mendelli*	1 00
Mrs. B. P. Cheney, Calceolarias	2 00
Dr. C. G. Weld, Display of Azalea and *Boronia elatior*	5 00
Dr. C. G. Weld, Display	4 00
Charles H. Souther, Ivy-leaved Pelargoniums	2 00

MAY 20.

Gratuity:—

Rea Brothers, Display of *Primula Sieboldi*	2 00

MAY 27.

Gratuity:—

James E. Rothwell, *Uropedium Lindeni*	1 00

RHODODENDRON EXHIBITION.

JUNE 7 AND 8 (*postponed from* JUNE 1 AND 2).

ORCHIDS.— Display, arranged for effect, with foliage plants, in a space eight feet by five feet:

First, H. H. Hunnewell	30 00
Second, J. S. Bailey	25 00
Third, J. E. Rothwell	20 00

Gratuities:—

Mrs. Walter E. Searles, Boston Fern	3 00
Robert Laurie, Newport, R. I., *Araucaria Bidwillii*	3 00
Edward Butler, *Cattleya Gaskelliana*	5 00
Edward J. Mitton, Pelargoniums	8 00
Dr. C. G. Weld, Display of Pelargoniums and Orchids	8 00

JUNE 10.

Gratuity:—

Dr. C. G. Weld, Display of Orchids and Pelargoniums	10 00

ROSE AND STRAWBERRY EXHIBITION.

JUNE 22 AND 23.

DECORATIVE PLANTS.— Group, arranged for effect, covering seventy-five square feet:

First, J. S. Bailey	30 00
Second, E. S. Converse	25 00

ORCHIDS.— Six plants, of six named varieties, in bloom:

First, James E. Rothwell	15 00

Second, W. P. Winsor 10 00
Three plants, of three named varieties, in bloom:
First, W. P. Winsor 10 00
Single specimen, named:
First, W. P. Winsor 5 00
Second, W. P. Winsor 3 00

Gratuity:—
J. S. Bailey, *Acalypha hispida* 4 00

JULY 1.

Gratuity:—
Edward J. Mitton, *Cattleya Gigas* 2 00

JULY 8.

Gratuity:—
Edward J. Mitton, *Cattleya Gaskelliana* 1 00

JULY 15.

HYDRANGEAS.— Pair, in tubs:
First, H. Dumaresq 15 00
Second, H. Dumaresq 10 00
Single plant, in tub or pot:
First, H. Dumaresq 5 00
ACHIMENES.— Six, of six varieties, in not over ten-inch pans or pots:
First, H. Dumaresq 5 00

Gratuity:—
Mrs. John L. Gardner, Display 2 00

EXHIBITION OF AQUATIC PLANTS AND FLOWERS, ASTERS, ETC.

AUGUST 19.

OUVIRANDRA FENESTRALIS:
First, E. S. Converse 6 00
Second, Mrs. John L. Gardner 4 00
CANNAS.— Collection of not less than six named varieties, grown in pots:
Third, Mrs. John Jeffries 6 00

Gratuity:—
H. A. Wheeler, *Epidendrum venosum* 1 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

AUGUST 30 AND 31.

H. H. Hunnewell Fund.

HARDY CONIFEROUS TREES.— Display in pots and tubs, named:
First, Francis Blake 25 00

Society's Prizes.

PALMS.— Pair, in pots or tubs not more than twenty-four inches in diameter:
First, J. S. Bailey 12 00
Pair, in pots not more than fourteen inches in diameter:
First, Mrs. John L. Gardner 8 00
Second, Dr. C. G. Weld 6 00
GREENHOUSE PLANTS.— Collection containing foliage plants of all descriptions, not to exceed forty plants, in pots or tubs:
First, J. S. Bailey 40 00
Second, Mrs. John L. Gardner 30 00
Six Greenhouse and Stove plants, of different named varieties, two Crotons admissible:
First, J. S. Bailey 25 00
Second, Mrs. John L. Gardner 20 00
Third, Dr. C. G. Weld 15 00
TABLE DECORATION.— For fifteen covers, living plants, in one receptacle, only one entry admissible:
First, James E. Rothwell 10 00
Second, W. H. Lincoln 8 00
Third, E. J. Mitton 6 00
Fourth, H. A. Wheeler 4 00
SPECIMEN FLOWERING GREENHOUSE PLANT.— Single named variety:
First, James Garthley 8 00
Second, James E. Rothwell 6 00
FUCHSIAS.— Six plants:
Second, Charles H. Souther 10 00
CALADIUMS.— Six named varieties:
First, Charles H. Souther 8 00
FERNS.— Specimen, other than Tree Fern:
First, J. S. Bailey 4 00
Second, Dr. C. G. Weld 3 00
ADIANTUMS.— Four named varieties:
First, Dr. C. G. Weld 8 00
LYCOPODS.— Four named varieties:
First, Dr. C. G. Weld 5 00

Dracænas.— Six named varieties:	
First, J. S. Bailey	8 00
Second, Dr. C. G. Weld	6 00
Crotons.— Twenty-five plants, not less than eighteen named varieties in not less than six-inch pots:	
First, James E. Rothwell	12 00
Second, J. S. Bailey	10 00
Third, Edward J. Mitton	8 00
Six named varieties, in not less than eight-inch pots:	
First, Dr. C. G. Weld	10 00
Second, W. H. Lincoln	8 00
Cycad.— Single plant, named:	
First, Mrs. John L. Gardner	10 00
Nepenthes.— Three plants, named:	
Second, Edward J. Mitton	8 00
Begonia Rex.— Six pots of six varieties:	
First, E. S. Converse	8 00
Begonia Rex Hybrids.— Collection, named:	
First, E. S. Converse	8 00
Gratuities:—	
Oakes Ames, Caladiums	3 00
J. M. Southwick, Seedling Begonia, Woodstock	1 00
James Comley, *Fourcroya Lindeni*	5 00
E. S. Converse, Display of Greenhouse and Stove plants	15 00
Harvard Botanic Garden, Display of Orchids	8 00
John Shepard, *Oncidium Carthaginense*	1 00

September 8.

Gratuity:—	
Edward J. Mitton, *Cattleya labiata*	2 00

September 16.

Gratuities:—	
James E. Rothwell, *Cypripedium Isabellæ* and *C. Josephianum*	2 00
H. A. Wheeler, *Cattleya chrysotoxa*	1 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

September 28 and 29.

Decorative Plants.— Display, not less than forty, not to exceed three feet in height, to be arranged by the Committee:	
First, J. S. Bailey	25 00
Second, E. S. Converse	20 00

October 28.

Gratuities:—	
Edward J. Mitton, *Oncidium varicosum*	1 00
H. A. Wheeler, *Cattleya labiata*	2 00

CHRYSANTHEMUM SHOW.

NOVEMBER 7, 8, 9, AND 10.

CHRYSANTHEMUMS.— Display of twelve named plants, any or all classes, distinct varieties:

First, Mrs. B. P. Cheney	50 00
Second, J. S. Bailey	40 00
Third, Walter Hunnewell	30 00
Fourth, E. S. Converse	20 00
Three Japanese Incurved:	
First, Mrs. B. P. Cheney	10 00
Three Reflexed, distinct named varieties:	
First, Mrs. B. P. Cheney	10 00
Specimen Incurved, named variety:	
First, Mrs. B. P. Cheney	6 00
Second, James Garthley	5 00
Third, Mrs. B. P. Cheney	4 00
Specimen Reflexed, named variety:	
First, Mrs. B. P. Cheney	6 00
Second, Mrs. B. P. Cheney	5 00
Third, Mrs. B. P. Cheney	4 00
Specimen Anemone Flowered, named variety:	
First, Walter Hunnewell	6 00
Second, James Garthley	5 00
Specimen Pompon, named variety:	
First, Mrs. B. P. Cheney	4 00
Second, Walter Hunnewell	3 00
Twelve plants, of twelve different varieties, grown to one stem and bloom, in not over six-inch pots, preference being given to plants not more than three feet in height:	
First, C. H. Souther	8 00
Second, Dr. C. G. Weld	6 00
Third, E. S. Converse	4 00
Fourth, H. Dumaresq	2 00
Six plants grown as above but all one color, Red:	
First, Dr. C. G. Weld	4 00
Second, H. Dumaresq	3 00
Third, E. S. Converse	2 00
White:	
First, Dr. C. G. Weld	4 00
Second, E. S. Converse	3 00
Third, C. H. Souther	2 00
Pink:	
First, C. H. Souther	4 00
Second, Dr. C. G. Weld	3 00
Third, Dr. C. G. Weld	2 00

Yellow:

First, James Nicol	4 00
Second, James Nicol	3 00
Third, E. S. Converse	2 00

Any other color:

First, Dr. C. G. Weld	4 00
Second, C. H. Souther	3 00
Third, E. S. Converse	2 00

Six plants grown to bush form, in not over eight-inch pots, without stakes:

First, Walter Hunnewell	8 00
Second, Walter Hunnewell	6 00

Group of Chrysanthemums, arranged for effect, with palms and decorative foliage plants, limited to one hundred square feet:

First, Mrs. John L. Gardner	25 00
Second, Mrs. John L. Gardner	20 00
Third, E. S. Converse	15 00

Gratuities:—

Harvard Botanic Garden, Display (nineteen plants) of Chrysanthemums	15 00
James Garthley, Specimen Chrysanthemum plant	2 00
Dr. C. G. Weld, Display of Begonia Gloire de Lorraine	3 00
Harvard Botanic Garden, Display (sixty plants) of Begonia Gloire de Lorraine	12 00
William W. Edgar, Display of Begonia Gloire de Lorraine, Ferns, and Dracænas	8 00
Lager & Hurrell, Summit, N. J., Display of Orchids	15 00

NOVEMBER 18.

Gratuity:—

H. A. Wheeler, *Odontoglossum crispum*	1 00

NOVEMBER 25.

Gratuity:—

J. E. Rothwell, Cypripedium Charles Canham	1 00

DECEMBER 2.

Gratuities:—

J. E. Rothwell, *Cypripedium Leeanum*	1 00
J. E. Rothwell, *Odontoglossum crispum*	1 00

DECEMBER 9.

ORCHIDS.— Six plants, named varieties, in bloom:

First, J. E. Rothwell	15 00
Second, J. E. Rothwell	10 00

Three plants, named varieties, in bloom:	
First, J. E. Rothwell	10 00
Second, Mrs. John L. Gardner	8 00
Single plant, named, in bloom:	
First, Mrs. John L. Gardner	5 00
Second, J. E. Rothwell	4 00
Gratuity:	
Mrs. John L. Gardner, Display of Primulas	3 00

SOCIETY'S GOLD MEDALS.

February 11. George McWilliam for Seedling *Cymbidium eburneo-Lowianum.*

August 30. George McWilliam for Seedling Dipladenias.

APPLETON GOLD MEDAL.

August 12. C. G. Roebling, Trenton, N. J., for *Cattleya* × *Hardyana*, Trenton var.

SILVER GILT MEDALS.

January 28. J. E. Rothwell, for *Cypripedium* × *Chapmanii* var. *rubellum.*

May 27. J. E. Rothwell, for *Cypripedium* × *Aylingii.*

SOCIETY'S SILVER MEDALS.

January 7. J. E. Rothwell, for *Cypripedium Exul.*

February 4. George McWilliam, for *Cypripedium* × *Hobsonii.*

" 25. C. G. Roebling, for *Cypripedium* × *Roeblingianum.*

March 4. Mrs. John L. Gardner, for Superior Cultivation of *Erica melanthera.*

April 15. George McWilliam, for Cypripedium × Mrs. George Marston Whitin.

April 22. Edward Butler, for Superior Cultivation of *Dendrobium densiflorum.*

May 6. J. S. Bailey, for *Areca Ilsemanni* (new palm).

" 20. J. E. Rothwell, for *Cypripedium leuchochilum* var. *Rothwellianum.*

Rhododendron Exhibition, June 7 and 8. H. H. Hunnewell, for *Miltonia Bleuana* var. *nobilior.*

July 1. George McWilliam, for *Dipladenia Boliviensis*, grown as a dwarf decorative plant.

" 15. J. S. Bailey, for *Sinospadie Petrickiana* (new palm).

August 12. C. G. Roebling, for *Cattleya* × *Hardyana*, Young's var.

" " Bayard Thayer, for Superior Cultivation of *Cattleya chrysotoxa.*

September 23. George McWilliam, for Laelio-Cattleya Catherine L. Whitin

October 21. Oakes Ames, for *Cattleya* × *Mantini*, var. *nobilior*.
November 4. William Duckham, for Display of six new varieties of Anoectochilus.
November 25. Oakes Ames, for *Cymbidium* × *Winnianum*.
" " Oakes Ames, for Specimen plant of *Cattleya chocoensis* var *virginalis*.
December 23. W. A. Manda, Orange, N. J., for *Cypripedium insigne* var. Mrs. George B. Wilson.

SOCIETY'S BRONZE MEDALS.

May 13. J. E. Rothwell, for Display of *Cypripedium niveum*.
August 12. C. G. Roebling, for *Cattleya* × *Hardyana* var. *Roeblingiana*.
November 4. Oakes Ames, for *Cypripedium insigne* var. *Ballae*.
" 18. J. E. Rothwell, for *Cypripedium* × Fairy Queen.

FIRST CLASS CERTIFICATES OF MERIT.

January 7. Oakes Ames, for Cypripedium × Madame Georges Truffaut.
" 14. J. E. Rothwell, for *Dendrobium Phalaenopsis* var. *albens*.
March 4. Rea Brothers, for *Deutzia discolor purpurescens*.
" " W. P. Winsor, *Dendrobium nobile*, var. *virginalis*.
Spring Exhibition, March 21–24. Dr. C. G. Weld, for Superior Cultivation of *Primula obconica*.
" " W. A. Manda, South Orange, N. J., for *Oncidium Saintlegerianum*.
April 1. J. E. Rothwell, for *Cypripedium* × *Lebaudianum*.
" 15. J. E. Rothwell, for *Cypripedium Rothschildianum*.
May 6. J. S. Bailey, for *Licuala Jeanenceyi*.
" 13. James Garthley, for Superior Cultivation of Zonale Pelargoniums.
June 3. H. H. Hunnewell, for Superior Cultivation of *Miltonia vexillaria*.
August 5. H. A. Wheeler, for Superior Cultivation of *Oncidium sarcodes*.
" 12. J. E. Rothwell, for *Laelia (Brassavola) Digbyana*.
Exhibition of Aquatic Plants and Flowers, Asters, etc., August 19. Mrs. John Jeffries, for *Nephrolepis exaltata* (sport).
Annual Exhibition of Plants and Flowers, August 30 and 31. E. O. Orpet, for *Laelia nigrescens*.
September 9. Oakes Ames, for *Cypripedium Kimballianum*.
" 16. J. E. Rothwell, for *Cypripedium* × *Thayerianum*.
" 23. J. E. Rothwell, for Cypripedium × H. Ballantine.
" " J.E. Rothwell, *Cypripedium* × *Uihleinianum (Allanianum)*.
Annual Exhibition of Fruits and Vegetables, September 28 and 29. E. O. Orpet, for *Cattleya Portia (C. Bowringiana* ♀ × *C. labiata* ♂*)*.
October 21. Oakes Ames, for *Cypripedium Smithii* × *Lucie (C. Lawrenceanum* × *C. ciliolare)*.

November 4. Oakes Ames, for *Batemannia Burtii.*
" " J. E. Rothwell, for *Cypripedium* × *Hurrellianum (C. Curtisii* × *C. Argus).*
" " J. E. Rothwell, for *Cypripedium regale* var. *purpuratum (C. insigne Maulii* × *purpuratum).*
November 25. J. E. Rothwell, for *Cypripedium Maynardii (C. Spicerianum* × *C. purpuratum).*
December 2. J. E. Rothwell, for *Cypripedium Alcides (C. insigne* × *C. hirsutissimum.)*
December 9. Oakes Ames, for *Cypripedium insigne* var. *citrinum.*
" " Oakes Ames, for *Cypripedium Deedmannianum.*
December 16. George McWilliam, for *Luculia gratissima.*

HONORABLE MENTION.

January 14. R. and J. Farquhar, *Begonia nana compacta* Gloire de Lorraine.
February 18. F. Prideux, *Cineraria Stellata*, hybrid.
March 11. R. and J. Farquhar, Cyclamen Bush Hill Pioneer.
Spring Exhibition, March 21–24. W. A. Manda, Begonia Vernon, double.
April 1. C. G. Roebling, *Cattleya Trianæ*, var. *Roeblingiana.*
Rhododendron Show, June 7 and 8. Dr. C. G. Weld, Seedling Zonale Pelargonium.
August 5. Oakes Ames, Collection of Botanical Orchids.
August 19. Oakes Ames, *Cattleya Gigas* × (*Hardyana?*).
October 28. John Mutch, *Cypripedium* × *Binglseyense* var. *Longwoodense.*

WILLIAM WALLACE LUNT,
JAMES WHEELER,
WILLIAM J. MARTIN,
ARTHUR H. FEWKES,
ROBERT CAMERON,
} *Committee on Plants.*

REPORT

OF THE

COMMITTEE ON FLOWERS.

FOR THE YEAR 1899.

By J. WOODWARD MANNING, CHAIRMAN.

The exhibitions for the year 1899, although in many instances of sterling merit, have not, on the whole, been up to the standard of past years. The peculiar weather conditions through which we have passed seriously interfered with the best efforts of our exhibitors at the time of the principal shows, and this effect continued more or less throughout the season. Taking the exhibitions in their chronological order, our report would be as follows:

During January the usual classes of exhibits were brought in and the more noteworthy were those of Oakes Ames, on the 7th, of a spike of *Cattleya chocoensis alba* which was particularly beautiful in its purity of color, and of which your Committee made Honorable Mention.

On January 21, J. E. Rothwell made an exhibit of *Laelia anceps* var. *Ballentinianum*.

During the Carnation and Orchid Show of February 4, the new Carnation Olympia, from John N. May, of Summit, N. J., received a First Class Certificate and the new Carnation Melba was given Honorable Mention. The balance of the month was taken up with the usual variety of exhibits and the more noteworthy awards were those of a gratuity to James E. Rothwell, for a fine spike of *Cattleya Trianae* var. *Backhousiana* and to the Harvard Botanic Garden for a fine display of *Toxicophlaea spectabilis*.

SPRING EXHIBITION.

March 21, 22, 23, and 24.

There was less competition at this show than in past years, and Hybrid Perpetual Roses were shown by few exhibitors only. The Carnation exhibit was closely contested and Violets were shown to the best possible effect. The new white Carnation Marquis, shown by Mr. E. L. Marquisee, was very noteworthy and was awarded the Society's Silver Medal. At the same exhibition Kenneth Finlayson displayed the new crested form of *Cyclamen Persicum*, for which a First Class Certificate of Merit was given.

April 1, Hon. C. G. Roebling, of Trenton, N. J., exhibited *Cypripedium villosum giganteum*, of which Honorable Mention was made by the Committee.

May 6, James E. Rothwell was awarded a First Class Certificate of Merit for superior culture of *Phalaenopsis grandiflora*.

RHODODENDRON SHOW.

June 7 and 8.

Rhododendrons, in the June exhibits, had suffered very severely from drought and while the exhibits were, in the main, very commendable, yet as compared with previous years they could hardly be considered superior. At the exhibition of June 7 and 8, Herbert Dumaresq was awarded a First Class Certificate of Merit for a particularly noteworthy display of *Bougainvillea spectabilis*.

PÆONY SHOW.

June 10.

This was very effective and gave added evidence of the increase in popularity and value of this thoroughly hardy class of flowers. The display of blooms arranged for effect in the Society's vases called forth great admiration, and in many ways was considered fully as satisfactory as similar exhibits that are made later in the season with Chrysanthemums.

ROSE EXHIBITION.

June 22 and 23.

Unfortunately the drought had so severely interfered with the growth of Roses that the Rose Exhibition was in many respects a failure. Had it not been for the remarkable display made by the Heirs of Hon. Joseph S. Fay, the exhibition would hardly have warranted opening the doors. Under the circumstances, the above-named exhibitors practically swept the prizes throughout almost every class scheduled. At this exhibition Jackson T. Dawson displayed vases of Hybrid Roses, crosses between *Rosa Wichuraiana* and older garden forms. Among these crosses, one between *Rosa Wichuraiana* and *Rosa Indica carnea* was particularly noteworthy and was granted a Silver Medal by your Committee. Another similar cross, exhibited by Mr. Dawson under the name of William Eagan was granted a First Class Certificate of Merit.

July 1, among the many displays of Roses shown by the Heirs of Hon. Joseph S. Fay, was a new seedling Rose, a cross between *Rosa Wichuraiana* and Baroness Rothschild, which was given a Silver Medal by your Committee.

The Exhibition of Hollyhocks on the 8th of July was not up to the standard, owing to the severe killing that had been suffered by the plants during the previous winter.

July 29, Hicks Arnold made a display of *Cattleya Hardyana*, a choice species of extremely high merit for ornament, for which a Silver Medal was awarded by the Society. At this same exhibition, a very remarkable display of seedling Dipladenias was made by George McWilliam of Whitinsville, Mass. Among the differing varieties shown, a Silver Gilt Medal was awarded the variety George M. Whitin, a Silver Medal to the variety Mrs. George McWilliam, and a Bronze Medal to the variety Miss Lois H. Whitin. Perennial Phloxes were first exhibited July 29 and continued to be a very prominent feature of the exhibits throughout the remainder of the summer and autumn.

August 5, Dr. C. G. Weld was awarded a Silver Medal for *Watsonia Adernei*, and James F. Harlow was given a First Class Certificate of Merit for each of the new Gladiolii, Mme. Desbordes

Valmore and Baron Jos. Hulot. James E. Rothwell was given a First Class Certificate of Merit for superior culture of Cypripedium Frau Ida Brandt and *C. Edwardii* var. *superbum superbiens* and *C. Fairieanum*.

EXHIBITION OF AQUATIC PLANTS AND FLOWERS.

AUGUST 19.

The exhibition of Aquatics was not as satisfactory this season as in past years. This was accounted for in some instances by the severe drought influencing the level of the ponds to such an extent as seriously to interfere with the satisfactory blooming of aquatics. Bayard Thayer was granted a Silver Medal for *Nymphaea Brydonacea elegans* and the Henry A. Dreer Corporation of Philadelphia, was awarded a First Class Certificate of Merit for *Nymphaea fulva* and *N. rubra punctata*. At the same time E. G. Shaylor was granted a Silver Medal for Hybrid Gladioli, which were particularly rich in their varied color, and J. W. Howard received a First Class Certificate of Merit for a vase of Giant Comet China Asters, a pure white form of extraordinary size and strong growth; also for China Aster Daybreak, a variety of a most charming rich shade of pink and of first-class quality and size.

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

AUGUST 30 AND 31.

From the middle of August until hard frosts Dahlias were the showiest features of the exhibitions, and the display of Dahlias at the Annual Exhibition was in many respects a revelation of the worth of this flower. There was a marked increase in the size and quality of the blooms and also a greater range of color as compared with previous years. The Dahlia Show was most admirably staged by the competitors and the competition was extremely close. Altogether, it was probably the most successful of any class of flowers during the past season. In connection with the Dahlia Show, a most admirable exhibition of Perennial Phloxes was made by Rea Brothers, showing the great improvement in the size of

the flowers and their range of color. Cornelius Vanderbilt, of Newport, R, I., made a very effective display of named Montbretias, Besseras, and Acidantheras, and at this exhibition Oakes Ames gave us one of the most satisfactory displays of aquatics made during the season. James Brydon was awarded Honorable Mention for his new variety of Nymphæa called Arethusa.

During September, Dahlias continued to be shown in great profusion and the desirability of extending the scheduled awards of this class of plants was evident.

September 16, Frederick S. Davis made a display of *Incarvillea variabilis*, of which Honorable Mention was made by your Committee.

On the 4th of November H. A. Wheeler was granted a First Class Certificate of Merit for *Zygopetalum Mackayi* var. *cœruleum*, showing great improvement in depth of color and markings over the old type.

CHRYSANTHEMUM SHOW.

November 7, 8, 9, and 10.

Competition was not as close at this exhibition as in past years. The exhibits made by the Waban Conservatories were fully up to the standard of previous seasons as was also the case with most of the other exhibits, but owing to the lack of competition as compared with other years the hall was not as well filled with flowers as in other seasons, thus making a less effective display. Competition for the best arrangement of Chrysanthemums in the Society's vases was close, and the awards, from the reading of the Schedule, necessarily varied from day to day according to the satisfactory condition in which the vases were maintained by the exhibitors. A change in the Schedule whereby the award on each particular day was to be final has been suggested, and probably would be much more satisfactory to exhibitors than the past method. The number of competitors was less than was hoped, but there probably will be a great increase under the new arrangement. There were no entries of any Seedling Chrysanthemums, which would indicate less interest in their production than in past seasons. Dr. F. I. Williams received Honorable Mention for Chrysanthemum Bessie Jones.

Charles S. Cooper was awarded Honorable Mention for a new Carnation exhibited under the name of Crawford. Other Honorable Mentions were granted Mr. E. F. Wilson for Cosmos Klondike and John Cook for the Hybrid Tea Rose Baltimore.

The exhibition of Hardy Perennials throughout the season has been very satisfactory and promises to be one of the most important features in coming years. While severe weather conditions, it is true, seriously interfered with the most satisfactory results, as in the past two years, still an impetus for increased competition will probably be given with the advent of better weather conditions in future years. We presume that our restricted facilities have been something of a discouragement to some exhibitors and feel confident that the enlarged accommodations in our new hall will bring forth far greater competition than ever in the past.

Herewith we append the list of prizes and other awards granted by your Committee during this season. The amount of our appropriation for the year 1899 was $2,668; the amount of awards and gratuities was $2,076, leaving a balance of $592, from which the cost of Medals and First Class Certificates of Merit and awards of the Native Plant Committee are to be deducted.

Respectfully submitted,

J. WOODWARD MANNING,

Chairman Flower Committee.

PRIZES AND GRATUITIES AWARDED FOR FLOWERS.

1899.

JANUARY 7.

PRIMULA SINENSIS.— Display of fifty or more individual blooms:	
First, Walter E. Coburn	$2 00
Second, Mrs. John L. Gardner	1 00
FREESIAS.— Vase of fifty spikes:	
First, Mrs. E. M. Gill	2 00
Second, W. N. Craig	1 00
Gratuities: —	
W. N. Craig, Vase of *Cypripedium insigne*	3 00
James E. Rothwell, Seedling Varieties of *Cypripedium insigne*	2 00

JANUARY 28.

Gratuities: —	
James Comley, Display	3 00
Mrs. E. M. Gill, "	2 00

FEBRUARY 4.

ORCHIDS.— Display of named species and varieties, filling not less than twenty bottles:	
First, Mrs. John L. Gardner	15 00
Second, J. E. Rothwell	10 00
VIOLETS.— Best collection of varieties, fifty blooms of each in a bunch:	
First, Norris F. Comley	4 00
CARNATIONS.— Display of cut blooms with foliage, not less than six varieties, in vases:	
First, William Nicholson	8 00
Second, M. A. Patten	6 00
Third, S. J. Goddard	4 00
CAMELLIAS.—Display of named varieties, cut flowers with foliage, not less than twelve blooms, in not less than six varieties:	
First, James Comley	4 00
Second, James Comley	3 00
Gratuities: —	
Walter E. Coburn, Chinese Primroses	1 00
James Comley, Display	2 00
Mrs. E. M. Gill, "	1 00
George McWilliam, Display	1 00

FEBRUARY 11.

Gratuities: —

Mrs. J. C. Whitin, Display of *Phaius grandifolius*	1 00
J. E. Rothwell, Display of *Cypripedium Harrisii* var. *superbum*	1 00
Jason S. Bailey, Vase of Carnations	2 00

FEBRUARY 18.

Gratuities: —

Harvard Botanic Garden, *Toxicophlaea spectabilis*	2 00
James E. Rothwell, *Cattleya Trianaei* var. *Backhousiana*	1 00
Mrs. E. M. Gill, Display	2 00
James Comley, "	2 00

FEBRUARY 25.

Gratuities: —

James Comley, Display	3 00
Mrs. E. M. Gill, "	2 00

MARCH 4.

Gratuity: —

James Comley, Display	3 00

MARCH 11.

Gratuity: —

Mrs. E. M. Gill, Display	2 00

MARCH 18.

Gratuity: —

R. McMillan, Vase of Mignonette	1 00

SPRING EXHIBITION.

MARCH 21, 22, 23, AND 24.

HYBRID PERPETUAL ROSES.— Twelve blooms, in not less than four named varieties:

First, Charles H. Souther	12 00
Six blooms, not less than three named varieties:	
First, Charles H. Souther	6 00
Twelve blooms of Ulrich Brunner:	
First, John McFarland	10 00
TENDER ROSES IN VASES.— Twenty-five blooms of Bridesmaid:	
First, William H. Elliott	12 00
Twenty-five blooms of The Bride:	
First, William H. Elliott	12 00
Second, Mrs. B. P. Cheney	10 00

CARNATIONS.— Vase of one hundred cut blooms with foliage, not less than six varieties:	
First, M. A. Patten	8 00
Second, William Nicholson	6 00
Third, Mrs. E. M. Gill	4 00
Twenty-five blooms of any named Crimson variety:	
First, M. A. Patten, for Ferdinand Mangold	2 00
Twenty-five blooms of any named Dark Pink variety:	
First, William Nicholson, for Mrs. F. Joost	3 00
Second, M. A. Patten, for Mrs. F. Joost	2 00
Twenty-five blooms of any named Light Pink variety:	
First, William Nicholson, for Daybreak	3 00
Second, Mrs. E. M. Gill, for Daybreak	2 00
Twenty-five blooms of any named Scarlet variety:	
First, M. A. Patten, for Bon Ton	3 00
Twenty-five blooms of any named White variety:	
First, William Nicholson, for White Cloud	3 00
Second, William Nicholson, for Eureka	2 00
Twenty-five blooms of any named Yellow variety:	
First, William Nicholson, for Eldorado	3 00
Twenty-five blooms of any named White variegated variety:	
First, William Nicholson, for Mrs. G. M. Bradt	4 00
Second, M. A. Patten, for Mrs. G. M. Bradt	3 00
PANSIES.— Forty-eight cut blooms, not less than twenty-four varieties, in flat dishes:	
First, Charles H. Souther	3 00
VIOLETS.— Bunch of one hundred blooms of Lady Hume Campbell:	
First, H. Dumaresq	3 00
Bunch of one hundred blooms of Marie Louise:	
Second, A. A. Thorndike	2 00
Bunch of one hundred blooms of any other double variety:	
First, W. L. Minor, for The Imperial	3 00
Bunch of one hundred blooms of any other single variety:	
First, Harry S. Rand, for Princess of Wales	3 00
Second, Mrs. John L. Gardner, for La France	2 00
ANTIRRHINUMS.— Display of not less than three varieties:	
First, Charles H. Souther	3 00
Second, Mrs. John Jeffries	2 00
Gratuities: —	
James Garthley, Cinerarias	2 00
Peter Fisher, Display of Carnations	3 00
Alex. McKay, Display of Roses	2 00
Mrs. E. M. Gill, Basket of Flowers	2 00
James Comley, Display	3 00
Mrs. E. M. Gill, "	1 00

APRIL 1.

Gratuity: —

Edward J. Mitton, Display of Gloxinias	3 00

APRIL 8.

Gratuities: —

E. A. & W. K. Wood, Display of Violets	3 00
James Comley, Display	2 00
Mrs. E. M. Gill, "	1 00

APRIL 15.

Gratuities: —

James Comley, Display	3 00
Mrs. E. M. Gill, "	1 00
Mrs. John Jeffries, Display	1 00

APRIL 22.

Gratuities: —

George Hollis, Display of Geraniums	2 00
James Comley, Display	1 00

APRIL 29.

Gratuities: —

Mrs. John Jeffries, Display of Antirrhinums	1 00
James Comley, Display	3 00
Mrs. E. M. Gill, "	1 00

MAY 6.

TULIPS. — Forty-eight blooms, not less than twelve named varieties:

First, W. N. Craig	4 00

HARDY NARCISSUSES. — Collection of fifty vases of not less than ten named varieties:

First, W. N. Craig	8 00

PANSIES. — Forty-eight blooms, not less than twenty-four varieties, in flat dishes:

First, Mrs. E. M. Gill.	4 00

Gratuities: —

Dr. C. G. Weld, Display of Hardy Narcissuses	4 00
Harvard Botanic Garden, Hardy Herbaceous Plants	4 00
W. S. Eager, Vase of Carnations	1 00
James Comley, Display	5 00
Mrs. E. M. Gill, "	1 00

MAY 13.

Gratuities: —

James Garthley, Display of Geraniums	2 00
James Comley, Display	4 00
Mrs. E. M. Gill, "	1 00

MAY 20.

Gratuities :—

Mrs. H. S. Stanley, Display of Cacti and Roses	1 00
Mrs. E. M. Gill, Display	2 00

MAY 27.

Gratuity :—

Mrs. E. M. Gill, Display	2 00

JUNE 3.

Gratuities :—

H. H. Hunnewell, Display of Rhododendrons	20 00
Mrs. E. M. Gill, Display	1 00

RHODODENDRON EXHIBITION.

JUNE 7 AND 8 (POSTPONED FROM JUNE 1 AND 2).

H. H. Hunnewell Fund.

RHODODENDRONS.— Twelve distinct varieties of unquestioned hardiness, named:	
First, James Comley	20 00
Second, Mrs. John L. Gardner	15 00
Six distinct varieties of unquestioned hardiness, named:	
First, James Comley	10 00
Six tender varieties, named:	
First, Mrs. John L. Gardner	5 00
Second, Mrs. John L. Gardner	4 00
HARDY AZALEAS, FROM ANY OR ALL CLASSES — Fifteen varieties, one vase of each:	
First, T. C. Thurlow	8 00
Twelve varieties, one vase of each:	
First, T. C. Thurlow	4 00
Cluster of trusses, one variety:	
First, T. C. Thurlow	2 00

Society's Prizes.

TREE PÆONIES.— Collection of single and double varieties, named:	
First, Mrs. John Jeffries	6 00
GERMAN IRISES.— Thirty-six vases of three trusses each, of not less than twelve varieties:	
First, Mrs. John L. Gardner	4 00
HARDY PYRETHRUMS.— Display of thirty bottles, Single and Anemone-flowered:	
Second, Rea Brothers	2 00

ORIENTAL POPPIES.—Display:	
Second, Mrs. E. M. Gill	2 00
AQUILEGIAS.— Collection, twenty-five vases:	
Second, Mrs. John Jeffries	2 00
Third, W. C. Winter	1 00
HARDY ORNAMENTAL TREES AND SHRUBS.— Display of not less than thirty species and varieties, named, cut blooms or foliage:	
First, T. C. Thurlow	8 00
Second, Miss Alice L. Grinnell	6 00
VASE OF FLOWERS:	
First, Miss Hattie B. Winter	4 00
Second, Mrs. E. M. Gill	3 00
Gratuities: —	
H. H. Hunnewell, Rhododendrons	20 00
H. H. Hunnewell, Display of Rhododendrons	10 00
James Comley, Rhododendrons	30 00
Mrs. B. P. Cheney, Rhododendrons	15 00
Mrs. John L. Gardner, Rhododendrons	10 00
F. W. Vanderbilt, Newport, R. I., Rhododendrons	3 00
T. C. Thurlow, Display of Pæonies	8 00
Mrs. John L. Gardner, Display of Pæonies	5 00
George Hollis, Display of Pæonies	2 00
Rea Brothers, Display of Pæonia festiva maxima	1 00
F. S. Davis, Two vases of Pæonies	2 00
Mrs. John Jeffries, German Irises	1 00
Dr. C. G. Weld, Pyrethrums and Aquilegias	8 00
Rea Brothers, Display of Herbaceous Perennials	2 00
Mrs. E. M. Gill, Display	2 00

PÆONY EXHIBITION.

JUNE 10.

HERBACEOUS PÆONIES. — Collection of named varieties, double:	
First, Kenneth Finlayson	12 00
Second, T. C. Thurlow	10 00
Collection of named varieties, single:	
First, T. C. Thurlow	6 00
Specimen bloom:	
First, T. C. Thurlow	2 00
Second, Kenneth Finlayson	1 00
Vase of blooms on long stems, arranged for effect in the Society's large China vases:	
First, Mount Vernon Nursery	10 00
Second, Kenneth Finlayson	8 00

Third, T. C. Thurlow	6 00
Fourth, Miss Hattie B. Winter	4 00
Gratuity:—	
Mrs. E. M. Gill, Display	3 00

ROSE AND STRAWBERRY EXHIBITION.

JUNE 22 and 23.

Special Prizes, Theodore Lyman Fund.

HARDY ROSES:—Twenty-four distinct named varieties, three of each variety:

First, Heirs of Hon. Joseph S. Fay	25 00
Second, Heirs of Hon. Joseph S. Fay	20 00
Third, Heirs of Hon. Joseph S. Fay	15 00

Society's Prizes.

Sixteen named varieties, three of each variety:	
First, Heirs of Hon. Joseph S. Fay	15 00
Twelve named varieties, three of each:	
First, Heirs of Hon. Joseph S. Fay	10 00
Three named varieties, three of each:	
Third, Heirs of Hon. Joseph S. Fay	1 00
Twenty-four blooms of Mme. Gabriel Luizet:	
First, Heirs of Hon. Joseph S. Fay	8 00
Six blooms of Alfred Colomb:	
Second, Heirs of Hon. Joseph S. Fay	2 00
Six blooms of Baroness Rothschild:	
Second, Heirs of Hon. Joseph S. Fay	2 00
Six blooms of John Hopper:	
First, Heirs of Hon. Joseph S. Fay	3 00
Six blooms of Jubilee:	
First, Heirs of Hon. Joseph S. Fay	3 00
Six blooms of Marshall P. Wilder:	
Second, Heirs of Hon. Joseph S. Fay	2 00
Six blooms of Merveille de Lyon:	
Second, Heirs of Hon. Joseph S. Fay	2 00
Six blooms of Mme. Victor Verdier:	
Second, Heirs of Hon. Joseph S. Fay	2 00
Twelve blooms of any other variety:	
First, Heirs of Hon. Joseph S. Fay	4 00
Second, Heirs of Hon. Joseph S. Fay	3 00
Third, Heirs of Hon. Joseph S. Fay	2 00
Best single bloom of any variety:	
First, Heirs of Hon. Joseph S. Fay	2 00

General Display.— One hundred bottles of Hardy Roses, buds admissible, each exhibitor limited to one entry:

First, Heirs of Hon. Joseph S. Fay	10 00

Basket of Roses.— Arranged for effect, to be shown the second day:

First, Mrs. E. M. Gill	5 00

Sweet Williams.— Thirty spikes, not less than six varieties:

First, William C. Winter	4 00
Second, W. N. Craig	3 00
Third, Mrs. John L. Gardner	2 00

Display, eighteen vases of three trusses each:

First, Mrs. John L. Gardner	4 00
Second, W. N. Craig	3 00

Vase of Flowers.— Best arranged:

First, Mrs. E. M. Gill	5 00
Second, William C. Winter	4 00

Gratuities:—

Heirs of Hon. Joseph S. Fay, Display of Roses	30 00
Heirs of Hon. Joseph S. Fay, Display of Roses, Bank	20 00
Heirs of Hon. Joseph S. Fay, Bank of Roses	10 00
Heirs of Hon. Joseph S. Fay, " " "	5 00
Heirs of Hon. Joseph S. Fay, " " "	5 00
Heirs of Hon. Joseph S. Fay, " " "	5 00
Heirs of Hon. Joseph S. Fay, " " "	5 00
Rea Brothers, Display of Perennials	2 00
Mrs. John Jeffries, Foxgloves and Irises	1 00
Kenneth Finlayson, Gloxinias	4 00
James Comley, Display	10 00
Mrs. E. M. Gill, "	8 00
T. C. Thurlow, "	6 00
W. E. Coburn, "	1 00

July 1.

Hardy Roses.— Collection, named, not less than twenty-five varieties filling fifty vases, one rose in each vase:

First, Heirs of Hon. Joseph S. Fay	15 00

Iris Kæmpferi.— Six varieties, three of each, in vases:

First, Dr. C. G. Weld	4 00
Second, Mrs. John L. Gardner	3 00

Lilium candidum.— Twelve spikes:

Second, Sumner Coolidge	2 00

Campanula Medium.— Collection, not less than fifteen bottles:

Second, Mrs. John L. Gardner	4 00

Sweet Williams.— Auricula-flowered, thirty spikes of not less than six distinct varieties:

Second, William C. Winter	2 00

DELPHINIUMS.— Collection of twenty spikes, not less than five varieties:	
First, Mrs. John L. Gardner	5 00
Display, thirty vases of three spikes each:	
First, Mrs. John L. Gardner	6 00
HARDY HERBACEOUS PLANTS.— Thirty bottles:	
First, Rea Brothers	8 00
Second, W. N. Craig	6 00
VASE OF FLOWERS:	
First, Mrs. E. M. Gill	4 00
Second, Miss Hattie B. Winter	3 00
Gratuities: —	
Norris F. Comley, Display of Iris Kæmpferi	2 00
E. S. Converse, Display of Tuberous Begonias	2 00
E. C. Lewis, Display of Hollyhocks	1 00
Heirs of Hon. Joseph S. Fay, Display of Crimson Rambler Roses	3 00
Heirs of Hon. Joseph S. Fay, Display	6 00
W. N. Craig, "	3 00
Rea Brothers, "	2 00

JULY 8.

HOLLYHOCKS.— Double, twelve blooms, of twelve colors, in flat dishes:	
Second, Heirs of Hon. Joseph S. Fay	4 00
Double, six blooms, of six colors, in flat dishes:	
First, W. N. Craig	3 00
Second, Heirs of Hon. Joseph S. Fay	2 00
Double, twelve spikes:	
First, Heirs of Hon. Joseph S. Fay	5 00
PERENNIAL PHLOXES.— Suffruticosa or early-blooming section, collection of named varieties:	
First, Rea Brothers	3 00
VASE OF FLOWERS.— Best arranged:	
First, Mrs. E. M. Gill	4 00
Second, Miss Hattie B. Winter	3 00
Gratuities: —	
L. F. Kinney, *Rhododendron maximum*	1 00
James Comley, " "	1 00
James Comley, *Combretum purpureum*	1 00
Norris F. Comley, *Iris Kæmpferi*	2 00
Heirs of Hon. Joseph S. Fay, Display of Roses	5 00
Rea Brothers, Rose Display	3 00
Heirs of Hon. Joseph S. Fay, Display of Hollyhocks	4 00
Mrs. John L. Gardner, " " "	1 00

W. N. Craig, Display	5 00
Mrs. E. M. Gill, "	1 00
E. C. Lewis, "	1 00

JULY 15.

TUBEROUS BEGONIAS.— Collection, arranged with their own foliage, in flat dishes:

First, H. Dumaresq	4 00
Second, E. S. Converse	3 00

HARDY AQUATIC FLOWERS.— Collection, named:

First, Mrs. John L. Gardner	8 00

Gratuities: —

George F. Sylvester, Hollyhocks	1 00
George Hollis, Ipomœa and Geraniums	1 00
Mrs. John L. Gardner, Drummond Phlox	2 00
Rea Brothers, Hardy Perennials	2 00
Heirs of Hon. Joseph S. Fay, Display	5 00
Mrs. E. M. Gill, "	2 00
W. N. Craig, "	2 00
E. C. Lewis, "	1 00

JULY 22.

HARDY HERBACEOUS PLANTS.— Thirty bottles:

First, W. N. Craig	8 00
Second, Rea Brothers	6 00
Third, Julius Heurlin	4 00

VASE OF FLOWERS.— For table decoration:

First, Miss Hattie B. Winter	4 00

Gratuities: —

W. N. Craig, Display of Sweet Peas and Phlox	3 00
Mrs. E. M. Gill, Display	3 00
George Hollis, "	2 00

JULY 29.

PERENNIAL PHLOXES. — Twelve named varieties, one truss of each:

First, W. N. Craig	3 00
Second, George Hollis	2 00

ANTIRRHINUMS. — Display of thirty vases, three spikes in each, not less than ten varieties:

Second, Edward J. Mitton	3 00
Third, Mrs. John Jeffries	2 00

Gratuities: —

Mrs. John L. Gardner, Phlox	2 00

Rea Brothers, Perennials	2 00
E. C. Lewis, Sweet Peas	1 00
W. N. Craig, Display	3 00
Mrs. E. M. Gill, "	2 00

AUGUST 5.

ANNUALS.— General display, named, filling not less than one hundred and fifty bottles:

First, Mrs. John L. Gardner	10 00
Second, Mrs. E. M. Gill	8 00
Third, Charles H. Souther	6 00

Gratuities: —

H. H. Hunnewell, Ixora and Rhododendrons	2 00
H. H. Hunnewell, Display of Orchids	5 00
J. Warren Clark, Gladioli	4 00
Rea Brothers, Hardy Phlox in fifty-six varieties	3 00
Mrs. John L. Gardner, Hardy Phlox	2 00
George Hollis, Display of Phlox	1 00
James Comley, " " "	1 00
I. E. Coburn, Display of Pansies	3 00
Hon. C. W. Hoitt, Nashua, N.H., *Lilium auratum* and *L. Batemannia*	2 00
Norris F. Comley, Asters	2 00
William C. Winter, Dahlias	3 00
Charles H. Souther, Antirrhinums	1 00
Julius Heurlin, Display	1 00

AUGUST 12.

MONTBRETIA.— Display in vases:

First, Mrs. John L. Gardner	3 00
Second, W. N. Craig	2 00

PERENNIAL PHLOXES.— Eighteen vases of eighteen named varieties, not exceeding three trusses in each vase:

First, Rea Brothers,	5 00
Second, George Hollis	4 00
Third, William C. Winter	3 00

Gratuities: —

William C. Winter, Dahlias	3 00
J. Heurlin, Hardy Herbaceous Perennials	3 00
Rea Brothers, Rudbeckia Golden Glow	2 00
J. Warren Clark, Named Gladioli	2 00
J. Warren Clark, Seedling Gladioli	2 00
Mrs. John L. Gardner, *Lilium tigrinum*	1 00
R. P. Struthers, Display	2 00
Mrs. E. M. Gill, "	2 00
Hon. C. W. Hoitt, "	2 00
James Comley, "	2 00

AUGUST 19.

Theodore Lyman Fund.

AQUATICS.—General Display of Nymphæas, Nelumbiums, Sedges, Papyrus, and other aquatic plants, arranged for effect, to include not less than twenty-five blooms of Nymphæas:

First, Henry A. Dreer Corporation, Philadelphia	25 00

GLADIOLI.—Twenty named varieties in spikes:

First, J. Warren Clark,	4 00

Ten named varieties in spikes:

First, J. Warren Clark	3 00

Six named varieties, in spikes:

First, J. Warren Clark	2 00

Display of named and unnamed varieties, filling one hundred vases, arranged for effect, with any foliage:

First, J. Warren Clark	8 00

ASTERS.— Large Flowered, of all classes, fifty vases, not less than twelve varieties, three flowers in each vase:

First, Charles H. Souther	6 00
Second, J. W. Howard	5 00
Third, Norris F. Comley	4 00

Truffaut's Pæony Flowered, thirty blooms, not less than twelve varieties:

Second, Charles H. Souther	3 00
Third, E. S. Converse	2 00

Victoria Flowered, thirty blooms not less than twelve varieties:

First, Charles H. Souther	4 00

HARDY HERBACEOUS PLANTS.— Thirty bottles:

Third, Julius Heurlin	4 00

Gratuities:—

J. Warren Clark, Collection of Gladioli	3 00
J. Warren Clark, Gladioli Seedlings	2 00
William C. Winter, Dahlias	3 00
Lothrop & Higgins, "	3 00
Mrs. J. B. Lawrence, "	2 00
George Hollis, Perennial Phlox	2 00
Mrs. John Jeffries, Lilies and Montbretias	1 00
Hon. C. W. Hoitt, Sweet Peas	1 00
Henry A. Dreer Corporation, New Cannas	2 00
Henry A. Dreer Corporation, Fringed Petunias	1 00
James Comley, Lilies and Tuberoses	1 00
Mrs. J. B. Lawrence, Tropæolums	1 00
Mrs. J. B. Lawrence, Sweet Peas and Pinks	1 00
Norris F. Comley, Collection	2 00
Mrs. John Jeffries, Display	2 00
R. P. Struthers, "	1 00

W. N. Craig, Display	2 00
Mrs. E. M. Gill, "	1 00

AUGUST 26.

Gratuities: —

Lothrop & Higgins, Display of Dahlias	6 00
Mrs. J. B. Lawrence, Gaillardias, Dahlias, and Gladioli	2 00
J. Warren Clark, Seedling Gladioli	2 00
Mrs. E. M. Gill, Display	1 00
I. E. Coburn, "	1 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

AUGUST 30 AND 31.

DAHLIAS.—Show, eighteen blooms, named varieties:	
First, Lothrop & Higgins	4 00
Second, William C. Winter	3 00
Fancy, eighteen blooms, named varieties:	
First, H. F. Burt	4 00
Second, H. F. Burt	3 00
Cactus, twelve blooms, named varieties:	
First, H. F. Burt	4 00
Second, Lothrop & Higgins	3 00
Third, H. F. Burt	2 00
Decorative, twelve blooms, named varieties:	
First, Lothrop & Higgins	4 00
Second, H. F. Burt	3 00
Third, H. F. Burt	2 00
Show, Six blooms, named varieties:	
First, Lothrop & Higgins	2 00
Second H. F. Burt	1 00
Fancy, Six blooms:	
First, Lothrop & Higgins	2 00
Second, H. F. Burt	1 00
Best single bloom, of any class, introduction of 1897 or later:	
First, Lothrop & Higgins	1 00
Pompon, twelve vases, of three blooms each, named varieties:	
First, William C. Winter	3 00
Second, Lothrop & Higgins	2 00
Third, Lothrop & Higgins	1 00
Single, twelve vases of three blooms each, named varieties:	
First, William C. Winter	2 00
Second, William E. Endicott	1 00
General Display, all classes admissible, one hundred or more bottles:	
First, H. F. Burt	12 00

Second, William C. Winter	10 00
Third, Lothrop & Higgins	8 00
Fourth, Mount Vernon Nursery	6 00
Fifth, William H. Symonds	4 00
HARDY LILIES.— Collection of not less than four named species:	
Second, Sumner Coolidge	4 00
TROPAEOLUMS.— Display with their own foliage, filling twenty-five vases. not over twelve blooms of one variety in each:	
First, Mrs. J. W. Cain	3 00
Second, Mrs. E. M Gill	2 00
MARIGOLDS.— Display of French and African, filling twenty-five vases:	
First, Mrs. John L. Gardner	3 00
Second, E. C. Lewis	2 00
ZINNIAS.— Fifty double, not less than twelve varieties:	
First, E. C. Lewis	3 00
Second, E. C. Lewis	2 00
Fifty single, not less than twelve varieties:	
First, A. B. Howard	3 00
VASE OF FLOWERS.— For table decoration, on the last day of the exhibition:	
First, Miss Hattie B. Winter	4 00
Second, Mrs. E. M. Gill	3 00
Gratuities: —	
Oakes Ames, Aquatics	15 00
Mrs. W. C. Loring, *Lilium auratum*	1 00
Rea Brothers, Perennial Phlox	4 00
Julius Heurlin, Hardy Perennials	3 00
C. Vanderbilt, Newport, R.I., Montbretias, Besseras, and Acidantheras	3 00
Norris F. Comley, China Asters	2 00
James Garthley, Cockscombs	2 00
Schlegel & Fottler, Cannas	2 00
J. Warren Clark, Gladioli	2 00
Rea Brothers, New Perennials	2 00
Mrs. E. M. Gill, Vase of Allamandas	1 00
E. S. Converse, Tuberous Begonias	1 00
James Comley, Display	5 00
Mrs. E. M. Gill, "	1 00

SEPTEMBER 2.

Gratuities: —	
Lothrop & Higgins, Display of Dahlias	5 00
Mrs. J. B. Lawrence, Display	2 00

SEPTEMBER 9.

DAHLIAS.— Cactus, twelve blooms, named varieties:	
First. H. F. Burt	3 00

Second, H. F. Burt	2 00
Third, Lothrop & Higgins	1 00
HERBACEOUS PERENNIALS.—Thirty bottles:	
First, W. N. Craig	8 00
Second, Julius Heurlin	6 00
Third, Rea Brothers	4 00
Gratuities:—	
H. F. Burt, Dahlias	1 00
William C. Winter, Dahlias	1 00
Lothrop & Higgins, "	1 00
Mrs. George Duncan, Cockscombs	2 00
E. L. Dorr, "	2 00
Rea Brothers, Phlox and Sunflowers	2 00
J. E. Clapp, Chrysanthemum-flowered Sunflower	1 00
E. C. Lewis, Marigolds	1 00
Mrs. E. M. Gill, Display	3 00

SEPTEMBER 16.

PERENNIAL ASTERS.—Collection of Native or Introduced species and varieties:	
First, Mrs. E. M. Gill	5 00
Second, Misses Eleanor and Mollie Doran	4 00
Third, George Hollis	3 00
ORNAMENTAL FRUITED HARDY TREES AND SHRUBS:—	
First, Miss Alice L. Grinnell	8 00
Gratuities:—	
Julius Heurlin, Hardy Perennials	2 00
Mrs. J. B. Lawrence, Dahlias	2 00
F. A. Blake, Begonias	1 00
Henry A. Purdie, Solidagos	1 00
Robert Manning, Display	1 00

SEPTEMBER 23.

Gratuity:—	
Mrs. George Duncan, Display	1 00

SEPTEMBER 28.

Gratuities:—	
H. F. Burt, Display of Dahlias	5 00
Julius Heurlin, Display of Herbaceous Plants	2 00

SEPTEMBER 30.

Gratuities:—	
Lothrop & Higgins, Cactus and Decorative Dahlias	2 00
Mrs. J. B. Lawrence, Dahlias	1 00

CHRYSANTHEMUM SHOW.

NOVEMBER 7, 8, 9, AND 10.

Josiah Bradlee Fund.

CHRYSANTHEMUMS.— Twenty-five blooms of twenty-five distinct varieties, named:

First, Mrs. B. P. Cheney	20 00
Second, Arthur F. Whitin	15 00
Third, Col. Charles Pfaff	10 00
Six vases of six named varieties, ten blooms each:	
First, Waban Conservatories	30 00
Second, Norris F. Comley	25 00

Henry A. Gane Memorial Fund.

For the best twelve specimen blooms of any of the Seedling Chrysanthemums originated by the late Henry A. Gane:

First, Waban Conservatories	20 00
Second, Norris Comley	10 00

Society's Prizes.

Twelve cut blooms, Incurved, named, in vases:	
First, C. H. Souther	8 00
Second, E. S. Converse	6 00
Twelve cut blooms, Japanese Incurved, named, in vases:	
First, Mrs. B. P. Cheney	10 00
Second, Col. Charles Pfaff	6 00
Third, E. S. Converse	4 00
Twelve cut blooms, Anemone, named, in vases:	
First, C. H. Souther	8 00
Second, Dr. C. G. Weld	6 00
Third, E. S. Converse	4 00
Six cut blooms, Incurved, named, in vases:	
First, Dr. C. G. Weld	5 00
Second, E. S. Converse	4 00
Third, C. H. Souther	2 00
Six cut blooms, Japanese, named, in vases:	
First, C. H. Souther	6 00
Second, Mrs. B. P. Cheney	4 00
Third, Edward Whitin	2 00
Six cut blooms, Japanese Incurved, named, in vases:	
First, C. H. Souther	6 00
Second, Edward Whitin	4 00
Third, Edward Whitin	2 00

Six cut blooms, Reflexed, named, in vases:	
First, C. H. Souther	6 00
Second, Mrs. B. P. Cheney	4 00
Third, E. S. Converse	2 00
Six cut blooms, Anemone, named, in vases:	
First, E. S. Converse	5 00
Second, John Thomas	4 00
Third, C. H. Souther	2 00
Twelve sprays, Japanese, naturally grown, stems twenty-four inches or over, not less than six named varieties:	
Second, Norris F. Comley	3 00
Twelve sprays, Pompons, naturally grown, stems twenty-four inches or over, not less than six named varieties:	
First, J. W. Howard	4 00
Twelve best varieties, named, introductions of the current year:	
First, C. H. Souther	8 00
Second, J. W. Howard	6 00
Vase of ten blooms, on long stems, Pink, named:	
First, Waban Conservatories	10 00
Second, Mrs. B. P. Cheney	8 00
Third, Mrs. B. P. Cheney	6 00
Vase of ten blooms, on long stems, Red, named:	
First, Mrs. B. P. Cheney	10 00
Second, H. Dumaresq	8 00
Third, E. S. Converse	6 00
Vase of ten blooms, on long stems, White, named:	
First, Waban Conservatories	10 00
Second, Mrs. B. P. Cheney	8 00
Third, E. S. Converse	6 00
Vase of ten blooms on long stems, Yellow, named:	
First, Waban Conservatories	10 00
Second, Mrs. B. P. Cheney	8 00
Third, Mrs. B. P. Cheney	6 00
Vase of ten blooms, on long stems, any other color, named:	
First, Mrs. B. P. Cheney	10 00
Second, Mrs. B. P. Cheney	8 00
Third, Col. Charles Pfaff	6 00
Vase of blooms, on long stems, arranged in the Society's large China vases, to be kept in good condition during the exhibition:	
First, Norris F. Comley	20 00
Second, Col. Charles Pfaff	18 00
Third, Mrs. E. M. Gill	16 00
Fourth, Charles H. Souther	14 00
Fifth, J. W. Howard	12 00

Gratuities: —

J. W. Howard, Chrysanthemum Glory	3 00
J. W. Howard, Vase of Pompon Chrysanthemums	2 00
I. E. Coburn, Pansies	4 00
Sewell Fisher, Carnation Saxon	1 00
William Nicholson, Carnations	3 00
M. A. Patten, "	3 00
D. Carmichael, "	2 00
John Pritchard, "	2 00
Mrs. B. P. Cheney, Display	10 00
Mrs. E. M. Gill, "	5 00
James Comley, "	4 00
John Thomas, "	3 00
Alexander McKay, "	3 00
Norris Comley, "	2 00
J. W. Howard, "	1 00
Dr. F. S. Williams, "	1 00

NOVEMBER 25.

Gratuities: —

Oakes Ames, Cattleya chocoensis	2 00
Mrs. E. M. Gill, Display	1 00
James Comley, "	1 00

SOCIETY'S SILVER MEDALS.

February 11. James Comley, for *Prunus Pseudo-cerasus.*

Spring Exhibition, March 21. E. L. Marquisee, for Carnation The Marquis.

Rose Exhibition, June 22. Jackson T. Dawson, for *Rosa Wichuraiana* × *R. Indica.*

July 1. M. H. Walsh, for *Rosa Wichuraiana* × Baroness Rothschild.

" 29. Hicks Arnold, for *Cattleya Hardyana.*

" " George McWilliam, for Dipladenia Mrs. George McWilliam.

August 5. Dr. C. G. Weld, for *Watsonia Adernei.*

" 12. Bayard Thayer, for *Nymphaea Brydonacea elegans.*

" 19. E. J. Shaylor, for Gladioli hybrids.

SOCIETY'S SILVER GILT MEDAL.

July 29. George McWilliam, for Dipladenia George M. Whitin.

SOCIETY'S BRONZE MEDAL.

July 29. George McWilliam, for Dipladenia Miss Lois H. Whitin.

KELWAY SILVER GILT MEDAL.

June 10. Kenneth Finlayson, for eighteen named varieties of *Pæonia albiflora.*

KELWAY BRONZE MEDAL.

June 10. Thomas C. Thurlow, for eighteen named varieties of *Pæonia albiflora* (second prize).

FIRST CLASS CERTIFICATES OF MERIT.

January 21. James E. Rothwell, for *Laelia anceps* var. *Ballentinianum*.
February 4. John N. May, of Summit, N. J., for Carnation Olympia.
Spring Exhibition, March 21. Charles H. Souther, for Rose Carmine Pillar.
March 21. Kenneth Finlayson, for Crested *Cyclamen persicum*.
May 6. J. E. Rothwell, for Superior Culture of *Phalaenopsis grandiflora*.
Rhododendron Show, June 7. H. Dumaresq, for *Bougainvillea spectabilis*.
Rose Exhibition, June 22. Jackson T. Dawson, for Rose William Egan.
July 8. M. H. Walsh, for *Rosa Wichuraiana* × Bridesmaid.
August 5. James F. Harlow, for Gladiolus Mme. Desbordes-Valmore.
" " James F. Harlow, for Gladiolus Baron Joseph Hulot.
" " J. E. Rothwell, for superior culture of Cypripedium Frau Ida Brandt.
" " J. E. Rothwell, for *Cypripedium* × *Edwardii* var. *superbum superbiens*.
Exhibition of Aquatic Plants, etc., August 19. J. W. Howard, for Giant White Comet Aster.
August 19. J. W. Howard, for Aster Daybreak.
" " Henry A. Dreer Corporation, for *Nymphæa fulva*.
" " Henry A. Dreer Corporation, for *Nymphæa rubra punctata*.
October 28. J. E. Rothwell, for *Cypripedium* × *Brysa Sedenii candidulum* × *Boissierianum*.
November 4. H. A. Wheeler, for *Zygopetalum Mackaii caeruleum*.

HONORABLE MENTION.

January 7. Oakes Ames, for *Cattleya chocoensis alba*.
February 4. John N. May, for Carnation Melba.
April 1. Hon. C. G. Roebling, of Trenton, N. J., for *Cypripedium villosum* var. *giganteum*.
Annual Exhibition of Plants and Flowers, August 30. A. B. Howard, for Verbenas.
August 30. A. B. Howard, for Petunias.
" " James Brydon, for Nymphæa Arethusa.
September 16. F. S. Davis, for *Incarvillea variabilis*.
Chrysanthemum Show, November 7. Dr. F. S. Williams, for Chrysanthemum Bessie Jones.
November 7. Charles S. Cooper, for Carnation Crawford.
" " E. F. Wilson, for Cosmos Klondike.
" " John Cook, for Rose Baltimore.

J. WOODWARD MANNING,
MICHAEL H. NORTON,
KENNETH FINLAYSON,
FREDERICK S. DAVIS,
JAMES COMLEY,
} *Committee on Flowers.*

REPORT

OF THE

COMMITTEE ON FRUITS,

FOR THE YEAR 1899.

By E. W. WOOD, CHAIRMAN.

Owing to the partial failure of the apple crop in 1898, it was hoped by the growers that the trees which had failed to produce the usual crop on the even or bearing year would produce a largely increased quantity of fruit on the present odd calendar year. These hopes have been partially realized, as there have not been for many years so many apples shown at the exhibitions on the off year as during the past season. It would be to the advantage of both grower and consumer if a more even production of this most important fruit could be secured in successive years.

Owing to dry weather or other climatic conditions, fruits, especially late fall and winter varieties, matured earlier than usual, and it has been impossible to keep them under ordinary conditions as in former years.

Pears have been shown in about the usual quantity, but the crop has been below the average. The market has not at any time been oversupplied with good fruit of the desirable varieties.

The exhibitions during the year have been fully up to the average of former years and have been well attended. The Strawberry Exhibition proved one of the most interesting of the year; more new and promising varieties were shown than in any other class of fruits. It is impossible to recommend varieties for general cultivation as they vary so much when grown in different

soils and locations. The safest guide for the grower would seem to be to test the most promising varieties in his own field or garden.

With the exception of Strawberries few new fruits have been shown deserving special mention. J. S. Chase and E. J. Recanco showed several varieties of seedling grapes, some of good quality — but the size and appearance of the bunches did not compare favorably with varieties in general cultivation.

The dry season was unfavorable for fungous growth and there was little injury to pears from cracking; several dishes of the Flemish Beauty were shown possessing all their former merit in size and appearance.

There has been awarded during the year in prizes and gratuities sixteen hundred and sixteen dollars, leaving an unexpended balance of one hundred and sixteen dollars.

E. W. WOOD, *Chairman.*

PRIZES AND GRATUITIES AWARDED FOR FRUITS.

1899.

SPRING EXHIBITION.

MARCH 21, 22, 23, AND 24.

WINTER APPLES.— Baldwin:	
First, C. F. Boyden	$3 00
Second, E. M. Bruce	2 00
Third, H. R. Kinney	1 00
Northern Spy:	
First, George V. Fletcher	3 00
Second, William O'Connell	2 00
Third, E. M. Bruce	1 00
Roxbury Russet:	
First, H. R. Kinney	3 00
Second, George V. Fletcher	2 00
Third, Joshua C. Stone	1 00
Tompkins King:	
First, George C. Rice	3 00
Second, F. J. Kinney	2 00
Third, C. L. Hartshorn	1 00
Any other variety:	
First, H. R. Kinney, Peck's Pleasant	3 00
Second, George C. Rice, Sutton Beauty	2 00
Third, George V. Fletcher, Fletcher Russet	1 00
WINTER PEARS.— Any variety:	
First, Warren Fenno, Duchess of Bordeaux	3 00
Second, A. T. Brown, Easter Beurré	2 00
STRAWBERRIES.— One pint:	
First, Francis Blake	3 00

APRIL 1.

Gratuity: —

Francis Blake, Strawberries	1 00

JUNE 7.

Gratuities: —

Warren Heustis & Son, Strawberries	1 00
William C. Winter, Peaches	1 00
H. R. Kinney, Apples	1 00

ROSE AND STRAWBERRY EXHIBITION.

JUNE 22 AND 23.

Special Prizes from the Theodore Lyman Fund.

STRAWBERRIES.— Four quarts of any variety:

First, Warren Heustis & Son, Marshall	20 00
Second, Benjamin M. Smith, Nick Ohmer	16 00
Third, Sumner Coolidge, Marshall	12 00
Fourth, George V. Fletcher, "	10 00
Fifth, Warren Heustis & Son, Belmont	8 00

Special Prizes offered by the Society.

Two quarts of any variety best adapted for garden cultivation for home use, to be judged by points:

First, Warren Heustis & Son, Marshall	6 00
Second, George V. Fletcher, "	5 00
Third, William C. Winter, Gen. Appleton	4 00
Fourth, I. E. Coburn, Belmont	3 00

Regular Prizes.

For the largest and best collection, not less than fifteen baskets of two quarts each, and not less than five varieties:

First, George F. Wheeler	20 00

Ten baskets, two quarts each, not less than three varieties:

First, Warren Heustis & Son	15 00
Second, George V. Fletcher	12 00
Third, George F. Wheeler	10 00
Fourth, I. E. Coburn	8 00

Two quarts of Belmont:

First, I. E. Coburn	4 00
Second, George V. Fletcher	3 00
Third, Warren Heustis & Son	2 00

Bubach:

First, George V. Fletcher	4 00
Second, I. E. Coburn	3 00
Third, Warren Heustis & Son	2 00

Clyde:

First, Levi Doran & Son	4 00
Second, Warren Heustis & Son	3 00
Third, George V. Fletcher	2 00

Crescent:

Second, I. E. Coburn	3 00
Third, William C. Winter	2 00

Enormous:
First, George F. Wheeler 4 00
Second, George V. Fletcher 3 00
Haverland:
First, I. E. Coburn 4 00
Second, George F. Wheeler 3 00
Hersey:
First, George F. Wheeler 4 00
Second, Sumner Coolidge 3 00
Jessie:
First, William C. Winter 4 00
Second, I. E. Coburn 3 00
Third, George V. Fletcher 2 00
Margaret:
First, Benjamin M. Smith 4 00
Second, George F. Wheeler 3 00
Marshall:
First, Sumner Coolidge 4 00
Second, Warren Heustis & Son 3 00
Third, George V. Fletcher 2 00
Miner's Prolific:
First, George F. Wheeler 4 00
Parker Earle:
First, I. E. Coburn 4 00
Second, George F. Wheeler 3 00
Sharpless:
Third, George F. Wheeler 2 00
Any other variety:
First, Samuel H. Warren, Seedling 4 00
Second, George V. Fletcher, Glen Mary 3 00
Third, Sumner Coolidge, Brandywine 2 00
Collection of not less than six varieties, one quart each:
First, George F. Wheeler 8 00
Second, George V. Fletcher 6 00
One quart of any new variety not previously exhibited:
First, Samuel H. Warren, Seedling 5 00
Second, John C. Haskell, " 4 00

CHERRIES.— Two quarts of any variety:
First, Miss Ellen W. Rumrill 4 00
Second, George V. Fletcher 3 00
Third, O. R. Robbins 2 00

FOREIGN GRAPES.— Two bunches of any variety:
First, E. S. Converse 6 00
Second, E. S. Converse 4 00

FORCED PEACHES.— Six specimens:
First, William C. Winter, Hale's Early 3 00
Second, William C. Winter, Waterloo 2 00

July 1.

Strawberries.— Any variety:	
First, Sumner Coolidge, Marshall	4 00
Second, Warren Heustis & Son, Marshall	3 00
Third, Samuel H. Warren, Seedling	2 00
Cherries.— Black Eagle:	
First, Charles B. Travis	3 00
Second, E. S. Converse	2 00
Third, F. W. Damon	1 00
Black Tartarian:	
First, George V. Fletcher	3 00
Second, O. R. Robbins	2 00
Third, James L. Duncan	1 00
Coe's Transparent:	
First, Charles S. Smith	3 00
Second, John L. Bird	2 00
Downer:	
First, Charles S. Smith	3 00
Second, M. W. Chadbourne	2 00
Third, A. T. Brown	1 00
Any other variety:	
First, Charles S. Smith, Hyde's Seedling	3 00
Second, Miss Vera Chapelle, Napoleon	2 00
Third, J. H. Fletcher, Royal Ann	1 00

July 8.

Raspberries.— Two quarts of any variety:	
First, E. C. Lewis	3 00
Currants.— Two quarts of any Red variety:	
First, W. N. Craig, Versaillaise	4 00
Second, Mrs. E. M. Gill, Versaillaise	3 00
Third, W. N. Craig, Fay's	2 00
Fourth, William O'Connell, Versaillaise	1 00
Two quarts of any White variety:	
First, H. R. Kinney	3 00
Second, W. N. Craig	2 00
Third, Mrs. John Jeffries	1 00
Gooseberries.— Two quarts of any American variety:	
First, W. N. Craig, Columbus	4 00
Second, W. G. Kendall, Bates	3 00
Third, W. N. Craig, Triumph	2 00
Fourth, Joseph S. Chase, Triumph	1 00
Gratuity:—	
Charles S. Smith, Hyde's Seedling Cherries	1 00

JULY 15.

RASPBERRIES.— Two quarts of any variety:	
First, Mrs. E. J. Cutter, Cuthbert	3 00
Second, Sumner Coolidge	2 00
Third, E. C. Lewis	1 00
CURRANTS.— One quart of any Red variety:	
First, W. N. Craig, Versaillaise	3 00
Second, W. N. Craig, Fay's	2 00
Third, Mrs. E. M. Gill, Versaillaise	1 00
One quart of any White variety:	
First, W. N. Craig, White Grape	2 00
Second, E. N. Horne, Dana's Transparent	1 00
GOOSEBERRIES.— Two quarts of any Foreign variety:	
First, W. G. Kendall, Industry	4 00
Second, W. N. Craig, "	3 00
Third, George L. Brown, White Smith	2 00

JULY 22.

BLACKBERRIES.— Two quarts of any variety:	
First, Sumner Coolidge	3 00
Second, M. W. Chadbourne	2 00
Third, Rev. Calvin Terry	1 00
APPLES.— Tetofsky:	
First, Samuel Hartwell	3 00
Second, Joseph S. Chase	2 00
PEARS.— Summer Doyenne:	
First, E. S. Converse	2 00
Second, David L. Fiske	2 00
Third, Sumner Coolidge	1 00
PEACHES.— Six of any variety:	
First, William C. Winter	3 00
Gratuities: —	
Mrs. John L. Gardner, Nectarines	1 00
W. N. Craig, Currants and Gooseberries	2 00

JULY 29.

APPLES.— Red Astrachan:	
First, F. W. Damon	3 00
Second, Samuel Hartwell	2 00
Third, S. F. & F. L. Weston	1 00
Sweet Bough:	
First, Sumner Coolidge	3 00
Second, George V. Fletcher	2 00
Third, Charles B. Travis	1 00

Any other variety:

First, Sumner Coolidge, Williams	3 00
Second, Joshua C. Stone, "	2 00
Third, Hittinger Brothers, "	1 00

PEARS.— Giffard:

First, A. T. Brown	3 00
Second, John L. Bird	2 00
Third, F. W. Damon	1 00

Any other variety:

First, A. T. Brown, Clapp's Favorite	3 00
Second, Sumner Coolidge, Clapp's Favorite	2 00
Third, Hittinger Brothers, Wilder	1 00

BLACKBERRIES.— Two quarts of any variety:

First, Sumner Coolidge	3 00
Second, M. W. Chadbourne	2 00
Third, Rev. Calvin Terry	1 00

PEACHES. — Open culture:

First, Sumner Coolidge, Hale's Early	3 00
Second, George H. Sherwin, Hale's Early	2 00
Third, Mrs. N. D. Harrington, Alexander	1 00

Gratuity: —

William H. Monroe, Gooseberries	1 00

AUGUST 5.

APPLES — Oldenburg:

First, Sumner Coolidge	3 00
Second, John L. Bird	2 00
Third, J. V. Fletcher	1 00

Any other variety:

First, Sumner Coolidge, Williams	3 00
Second, Hittinger Brothers, "	2 00
Third, Joshua C. Stone, "	1 00

PEARS.— Clapp's Favorite:

First, A. T. Brown	3 00
Second, Sumner Coolidge	2 00
Third, M. W. Chadbourne	1 00

Any other variety:

First, A. T. Brown, Giffard	2 00
Second, Warren Fenno, "	1 00

PEACHES.— Twelve specimens of outdoor culture, any variety:

First, Sumner Coolidge, Rivers	3 00
Second, George H. Sherwin, Hale's Early	2 00
Third, Mrs. N. D. Harrington	1 00

Six specimens of cold house culture:

First, William C. Winter, Crawford's Early	3 00
Second, William C. Winter, Crawford's Late	2 00

Blackberries.— Two quarts of any variety:	
First, Sumner Coolidge, Dorchester	3 00
Second, M. W. Chadbourne, "	2 00
Third, Rev. Calvin Terry, "	1 00
Plums.— Japanese, any variety:	
First, Hittinger Brothers, Abundance	3 00
Second, Sumner Coolidge, "	2 00
Third, Hon. Aaron Low, "	1 00
Foreign Grapes.— Two bunches of any variety:	
First, E. S. Converse, Black Hamburg	5 00
Second, William C. Winter, Black Hamburg	4 00
Gratuity: —	
Jackson T. Dawson, Nebraska Sand Cherry	1 00

August 12.

Apples.— Chenango:	
First, Sumner Coolidge	3 00
Second, Charles F. Curtis	2 00
Summer Pippin:	
First, Warren Fenno	3 00
Second, Samuel Hartwell	2 00
Williams:	
First, Hittinger Brothers	3 00
Second, Sumner Coolidge	2 00
Third, Joshua C. Stone	1 00
Any other variety:	
First, Mrs. O. Underwood	3 00
Second, Hittinger Brothers	2 00
Third, Joshua C. Stone	1 00
Pears.— Rostiezer:	
First, Sumner Coolidge	3 00
Second, M. W. Chadbourne	2 00
Third, A. T. Brown	1 00
Tyson:	
First, John L. Bird	3 00
Second, Warren Fenno	2 00
Any other variety:	
First, Sumner Coolidge	3 00
Second, A. T. Brown	2 00
Third, J. Cunning	1 00
Peaches.— Any variety:	
First, Sumner Coolidge	3 00
Second, W. N. Craig	2 00
Third, George H. Sherwin	1 00

PLUMS, JAPANESE.— Abundance:	
First, E. C. Lewis	3 00
Second, Butler & Jewell, Cromwell, Conn.	2 00
Third, Hittinger Brothers	1 00
Burbank:	
First, Butler & Jewell	3 00
Second, Hittinger Brothers	2 00
Third, Sumner Coolidge	1 00
Any other variety:	
First, George V. Fletcher	3 00
Second, Butler & Jewell, Berckmans	2 00
Third, Butler & Jewell, Satsuma	1 00
Gratuity: —	
William C. Winter, Peaches	1 00

AUGUST 19.

APPLES.— Gravenstein:	
First, Joshua C. Stone	3 00
Second, Sumner Coolidge	2 00
Third, Hittinger Brothers	1 00
Maiden's Blush:	
First, Joshua C. Stone	3 00
Second, Mrs. O. Underwood	2 00
Porter:	
First, Sumner Coolidge	3 00
Second, Joshua C. Stone	2 00
Third, Charles S. Smith	1 00
Any other variety:	
First, Hittinger Brothers, Williams	3 00
Second, Joshua C. Stone "	2 00
Third, Sumner Coolidge, Bietigheimer	1 00
PEARS.— Andrews:	
First, E. S. Converse	3 00
Second, Joshua C. Stone	2 00
Bartlett:	
First, A. T. Brown	3 00
Second, J. Cunning	2 00
Third, Sumner Coolidge	1 00
Any other variety:	
First, A. T. Brown, Clapp's Favorite	3 00
Second, Sumner Coolidge, Clapp's Favorite	2 00
Third, J. B. Beley, " "	1 00
PEACHES.— Single dish of any variety:	
First, Sumner Coolidge	3 00
Third, George L. Brown	1 00

PLUMS.— Bradshaw:

First, George V. Fletcher	3 00
Second, H. R. Kinney	2 00
Third, M. W. Chadbourne	1 00
Any other variety:	
First, Butler & Jewell, Cromwell, Conn., Abundance	3 00
Second, E. C. Lewis. Abundance	2 00
Third, Butler & Jewell, Burbank	1 00
NATIVE GRAPES.— Six bunches of Winchell or Green Mountain:	
First, H. R. Kinney	3 00
Second, Joseph S. Chase	2 00
Gratuities:—	
Miss Ellen W. Rumrill, Crab Apples	1 00
William C. Winter, Peaches	1 00

AUGUST 26.

Gratuity:—	
Joseph S. Chase, Native Grapes	1 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

AUGUST 30 AND 31.

Special Prizes from the Theodore Lyman Fund.

FOREIGN GRAPES.— For the heaviest and best ripened bunch of any Foreign Black Grape:	
First, George McWilliam	15 00
Second, Miss E. J. Clark	10 00
For the heaviest and best ripened bunch of any Foreign White Grape, Syrian excluded:	
First, Mrs. R. M. Clark	15 00

Society's Prizes.

FOREIGN GRAPES.— Black Alicante:	
First, Miss E. J. Clark	5 00
Second, J. C. Whitin	4 00
Black Hamburg:	
First, Miss E. J. Clark	5 00
Second, Daniel Brown	4 00
Third, William C. Winter	3 00
Lady Downes:	
First, Mrs. J. C. Whitin	5 00
Muscat of Alexandria:	
First, George McWilliam	5 00
Second, E. J. Bernard	4 00
Third, Miss E. J. Clark	3 00

Any other variety:

First, Mrs. R. M. Clark, Bowood Muscat	5 00
Second, Mrs. J. C. Whitin, Madresfield Court	4 00
Third, Mrs. J. C. Whitin, Golden Queen	3 00

Gratuities:—

F. W. Damon, Moore's Early Grapes	1 00
William C. Winter, Peaches	2 00

SEPTEMBER 9.

APPLES.— Gravenstein:

First, Charles S. Smith	3 00
Second, William Christie	2 00
Third, Sumner Coolidge	1 00

Maiden's Blush:

Second, H. R. Kinney	2 00

Porter:

First, M. W. Chadbourne	3 00
Second, Sumner Coolidge	2 00
Third, Joshua C. Stone	1 00

Washington Strawberry:

First, Sumner Coolidge	3 00
Second, Joshua C. Stone	2 00
Third, Hittinger Brothers	1 00

Any other variety:

First, C. L. Hartshorn, Sterling	3 00
Second, L. P. Rollins, New York Pippin	2 00
Third, Joshua C. Stone, " "	1 00

CRAB APPLES.— Transcendent:

First, L. J. Fosdick	2 00
Second, Mrs. O. Underwood	1 00

Any other variety:

First, M. W. Chadbourne, Hyslop	2 00
Second, C. L. Hartshorn, "	1 00

PEARS.— Bartlett:

First, William Milman	3 00
Second, A. T. Brown	2 00
Third, J. Cunning	1 00

Belle Lucrative:

First, E. S. Converse	3 00
Second, A. T. Brown	2 00
Third, F. J. Kinney	1 00

Boussock:

First, Sumner Coolidge	3 00
Second, Charles F. Curtis	2 00
Third, M. W. Chadbourne	1 00

Hardy:	
Second, Warren Fenno	2 00
Paradise of Autumn:	
First, Warren Fenno	3 00
Souvenir du Congrès:	
First, A. T. Brown	3 00
Second, Warren Fenno	2 00
Third, Sumner Coolidge	1 00
Any other variety:	
First, A. T. Brown, Louise Bonne of Jersey	3 00
Second, A. T. Brown, De Tongres	2 00
Third, C. E. Richardson, Flemish Beauty	1 00
PEACHES.— Coolidge's Favorite:	
First, Sumner Coolidge	3 00
Crawford's Early:	
First, A. A. Bradshaw	3 00
Second, W. N. Craig	2 00
Third, Sumner Coolidge	1 00
Crosby:	
Second, John Parker	2 00
Third, Sumner Coolidge	1 00
Foster:	
First, Charles F. Curtis	3 00
Second, Sumner Coolidge	2 00
Oldmixon Freestone:	
First, Sumner Coolidge	3 00
Second, Charles F. Curtis	2 00
Third, C. E. Swain	1 00
Stump the World:	
First, L. M. Chase	3 00
Second, Sumner Coolidge	2 00
PEACHES, ORCHARD HOUSE CULTURE.— Any variety:	
First, William C. Winter	4 00
PLUMS.— Imperial Gage:	
First, George V. Fletcher	3 00
Lombard:	
First, H. R. Kinney	3 00
Second, E. C. Lewis	2 00
Third, W. Warburton	1 00
Any other variety:	
First, Sumner Coolidge, Yellow Egg	3 00
Second, H. R. Kinney, Bradshaw	2 00
Third, John Parker, Golden Egg	1 00
Japanese, any variety:	
First, E. C. Lewis	3 00

NATIVE GRAPES.— Eumelan:	
First, Joseph S. Chase	3 00
Massasoit:	
First, H. R. Kinney	3 00
Second, F. J. Kinney	2 00
Third, Joseph S. Chase	1 00
Moore's Early:	
First, H. R. Kinney	3 00
Second, F. W. Damon	2 00
Third, William Christie	1 00
Any other variety:	
First, H. R. Kinney, Worden	3 00
Second, H. R. Kinney, Moore's Diamond	2 00
Third, F. J. Kinney, Worden	1 00
Any variety from girdled vines:	
First, F. J. Kinney, Brighton	3 00
Second, H. R. Kinney, Worden	2 00
Third, H. R. Kinney, Delaware	1 00
Gratuity: —	
Herbert Dumaresq, Foreign Grapes	3 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

SEPTEMBER 28 AND 29.

Special Prizes.

Samuel Appleton Fund.

APPLES.— Baldwin, Joshua C. Stone	5 00
Hubbardston, Joshua C. Stone	5 00
PEARS.— Bosc, A. T. Brown	5 00
Sheldon, A. T. Brown	5 00

Benjamin V. French Fund.

APPLES.— Gravenstein, C. F. Boyden	5 00
Rhode Island Greening, Joshua C. Stone	5 00

Marshall P. Wilder Fund.

PEARS.— Anjou:	
First, George V. Fletcher	4 00
Second, William Milman	3 00
Third, A. T. Brown	2 00
Fourth, F. W. Damon	1 00
Bartlett:	
First, George V. Fletcher	4 00
Second, Varnum Frost	3 00

Third, A. T. Brown	2 00
Fourth, M. W. Chadbourne	1 00
NATIVE GRAPES.— Twelve bunches of Concord:	
First, C. T. Hayward	4 00
Second, E. A. Adams	3 00
Third, H. R. Kinney	2 00
Fourth, W. D. Hinds	1 00
Twelve bunches of Worden:	
First, E. A. Adams	4 00
Second, F. J. Kinney	3 00
Third, H. R. Kinney	2 00
Fourth, Joseph S. Chase	1 00

Theodore Lyman Fund.

APPLES.— Baldwin:	
First, Joshua C. Stone	4 00
Second, C. F. Boyden	3 00
Third, F. W. Damon	2 00
Fall Orange:	
First, Charles S. Smith	3 00
Second, Charles T. Foster	2 00
Fameuse:	
First, H. Whittaker	3 00
Second, William Milman	2 00
Fletcher Russet:	
First, Charles F. Curtis	3 00
Gravenstein:	
First, C. F. Boyden	4 00
Second, Mrs. A. S. Underwood	3 00
Third, Charles S. Smith	2 00
Hubbardston:	
First, C. F. Boyden	4 00
Second, H. E. Rich	3 00
Third, Joshua C. Stone	2 00
Hunt Russet:	
First, C. F. Boyden	3 00
Third, W. H. Teele	1 00
Mackintosh:	
First, Edwin C. Stone	4 00
Second, Charles F. Curtis	3 00
Third, C. M. Handley	2 00
Maiden's Blush:	
Second, Warren Fenno	2 00
Mother:	
First, O. B. Hadwen	3 00
Third, George C. Rice	1 00

Northern Spy:	
First, C. H. Thomas	3 00
Second, William O'Connell	2 00
Third, Warren Fenno	1 00
Porter:	
First, Mrs. A. S. Underwood	3 00
Second, Edwin C. Stone	2 00
Third, Charles S. Smith	1 00
Pound Sweet:	
First, George V. Fletcher	3 00
Rhode Island Greening:	
First, Pliny Moore	4 00
Second, Joshua C. Stone	3 00
Third, C. L. Hartshorn	2 00
Roxbury Russet:	
First, Joshua C. Stone	4 00
Second, C. L. Hartshorn	3 00
Third, Warren Fenno	2 00
Sutton:	
First, C. L. Hartshorn	3 00
Third, Charles T. Foster	1 00
Tolman's Sweet:	
First, Mrs. A. S. Underwood	3 00
Second, W. F. Davidson	2 00
Tompkins King:	
First, C. F. Boyden	3 00
Second, George C. Rice	2 00
Third, Elliott Moore	1 00
Palmer:	
First, E. M. Bruce	3 00
Second, C. F. Boyden	2 00
Third, O. B. Hadwen	1 00
Any other variety:	
First, John Parker, Yellow Bellflower	3 00
Second, A. T. Brown, New York Pippin	2 00
Third, C. H. Thomas, Fallawater	1 00
CRAB APPLES.— Hyslop:	
First, W. E. Allen	2 00
Second, J. L. Richardson	1 00
Any other variety:	
First, Samuel H. Warren, Whitney	2 00

Special Prizes offered by the Society.

PEARS.— Anjou, A. T. Brown	5 00
Seckel, A. T. Brown	5 00
PEACHES.— Any variety, W. D. Hinds	5 00
NATIVE GRAPES.— Twelve bunches of any variety, H. R. Kinney	5 00

Regular Prizes.

PEARS.— Angouleme:	
First, A. T. Brown	4 00
Second, William O'Connell	3 00
Third, Warren Fenno	2 00
Bosc:	
First, E. S. Converse	4 00
Second, A. T. Brown	3 00
Third, S. F. & F. L. Weston	2 00
Fourth, Charles F. Curtis	1 00
Clairgeau:	
First, E. J. Recanco	3 00
Second, F. W. Damon	2 00
Third, Charles F. Curtis	1 00
Comice:	
First, A. T. Brown	3 00
Second, J. Cunning	2 00
Third, Leverett M. Chase	1 00
Dana's Hovey:	
First, A. T. Brown	4 00
Second, F. W. Damon	3 00
Third, J. Cunning	2 00
Fourth, C. E. Swain	1 00
Diel:	
First, A. T. Brown	3 00
Second, C. E. Swain	2 00
Third, J. Cunning	1 00
Fulton:	
First, E. S. Converse	3 00
Second, S. F. & F. L. Weston	2 00
Third, Warren Fenno	1 00
Hardy:	
First, Samuel Hartwell	3 00
Second, Charles F. Curtis	2 00
Third, Leverett M. Chase	1 00
Howell:	
First, E. W. Wood	3 00
Second, J. E. Fuller	2 00
Third, John J. Merrill	1 00
Josephine of Malines:	
First, Warren Fenno	3 00
Second, John L. Bird	2 00
Lawrence:	
First, A. T. Brown	3 00
Second, Warren Frost	2 00
Third, William S. Janvrin	1 00

Louise Bonne of Jersey:	
First, Mrs. James McCormick	3 00
Second, C. E. Richardson	2 00
Third, Mrs. N. D. Harrington	1 00
Marie Louise:	
First, C. E. Swain	3 00
Second, E. A. Hall	2 00
Third, Warren Fenno	1 00
Merriam:	
First, F. W. Damon	3 00
Second, Charles F. Curtis	2 00
Third, C. H. Plimpton	1 00
Onondaga:	
First, Charles B. Travis	3 00
Second, Warren Fenno	2 00
Third, John L. Bird	1 00
Seckel:	
First, A. T. Brown	4 00
Second, J. Cunning	3 00
Third, S. S. Hovey	2 00
Fourth, Mrs. N. D. Harrington	1 00
Sheldon:	
First, Mrs. Arthur C. Wiggin	4 00
Second, A. T. Brown	3 00
Third, G. E. Freeman	2 00
Fourth, George V. Fletcher	1 00
St. Michael Archangel:	
First, Benjamin P. Ware	3 00
Second, Warren Fenno	2 00
Third, Warren Heustis & Son	1 00
Superfin:	
First, Herbert Coolidge	3 00
Second, F. W. Damon	2 00
Third, Leverett M. Chase	1 00
Urbaniste:	
First, E. S. Converse	3 00
Second, A. T. Brown	2 00
Third, John L. Bird	1 00
Vicar:	
First, E. S. Converse	3 00
Second, A. T. Brown	2 00
Third, E. A. Hall	1 00
Winter Nelis:	
First, A. T. Brown	3 00
Second, J. Cunning	2 00
Third, E. A. Hall	1 00

Any other variety:	
First, Mrs. James McCormick, Flemish Beauty	3 00
Second, E. J. Recanco, President	2 00
Third, A. T. Brown, De Tongres	1 00
QUINCES.— Champion:	
First, Charles S. Smith	3 00
Second, E. M. Bruce	2 00
Third, George V. Fletcher	1 00
Orange:	
First, Arthur F. Coolidge	3 00
Second, J. S. Richardson	2 00
Third, George V. Fletcher	1 00
Pear:	
First, George V. Fletcher	3 00
Second, George L. Brown	2 00
Rea:	
First, Warren Fenno	3 00
Any other variety:	
First, H. O. Bates, Meech	3 00
Second, Joseph S. Chase, Meech	2 00
PEACHES.— Crawford's Late:	
First, W. N. Craig	3 00
Second, H. R. Kinney	2 00
Third, E. M. Bruce	1 00
Any other variety:	
First, W. D. Hinds, Crosby	3 00
Second, Benjamin M. Smith, Elberta	2 00
Third, W. N. Craig, Stump the World	1 00
Orchard house culture, any variety:	
First, William C. Winter	4 00
PLUMS.— Yellow Egg:	
First, George V. Fletcher	2 00
Any other variety:	
First, H. R. Kinney, Lombard	2 00
NATIVE GRAPES.— Brighton:	
First, E. A. Adams	3 00
Second, Joseph S. Chase	2 00
Third, Charles W. Libby	1 00
Delaware:	
First, H. R. Kinney	3 00
Second, Joseph S. Chase	2 00
Third, Warren Fenno	1 00
Herbert:	
First, Charles W. Libby	3 00
Second, Joseph S. Chase	2 00
Third, E. A. Adams	1 00

Iona:	
First, Joseph S. Chase	3 00
Second, F. W. Damon	2 00
Lindley:	
First, H. R. Kinney	3 00
Niagara:	
First, E. A. Adams	3 00
Second, C. F. Hayward	2 00
Third, Joseph S. Chase	1 00
Pocklington:	
First, Joseph S. Chase	4 00
Second, Charles W. Libby	3 00
Third, F. W. Damon	2 00
Fourth, H. R. Kinney	1 00
Prentiss:	
First, J. Cunning	3 00
Second, A. T. Brown	2 00
Third, Estate of Benjamin G. Smith	1 00
Wilder:	
First, E. A. Adams	3 00
Second, F. J. Kinney	2 00
Any other variety:	
First, E. A. Adams, Campbell's Early	3 00
Second, Charles W. Libby, Moore's Diamond	2 00
Third, H. R. Kinney, " "	1 00
Any variety from girdled vines:	
First, H. R. Kinney, Concord	3 00
Second, F. J. Kinney, Pocklington	2 00
FOREIGN GRAPES.— Two bunches of any variety, cold house culture:	
First, Daniel Brown, Bowood Muscat	5 00
Second, Daniel Brown, Alicante	4 00
CRANBERRIES.— Half-peck:	
First, L. J. Fosdick	3 00
Second, L. J. Fosdick	2 00
Third, L. J. Fosdick	1 00
Gratuities:—	
Sumner Coolidge, Display	15 00
E. M. Bruce, Edible Nuts	1 00
W. D. Hinds, " "	1 00
C. L. Hartshorn, " "	1 00

OCTOBER 21.

Gratuity:—	
Joseph S. Chase, Quinces	2 00

EXHIBITION OF WINTER FRUITS AND VEGETABLES.

NOVEMBER 18.

Benjamin V. French Fund.

APPLES.—Baldwin, C. F. Boyden	5 00
Rhode Island Greening, Mrs. A. S. Underwood	5 00

Society's Prizes.

APPLES.—Baldwin:	
First, J. W. Clark	3 00
Second, M. W. Chadbourne	2 00
Third, George C. Rice	1 00
Fletcher Russet:	
Second, Charles F. Curtis	2 00
Hubbardston:	
First, J. W. Clark	3 00
Second, C. F. Boyden	2 00
Third, John Parker	1 00
Hunt Russet:	
First, C. F. Boyden	3 00
Third, Rev. Calvin Terry	1 00
Northern Spy:	
First, E. C. Stone	3 00
Second, Warren Fenno	2 00
Third, George V. Fletcher	1 00
Rhode Island Greening:	
First, George V. Fletcher	3 00
Second, Mrs. E. M. Gill	2 00
Third, C. L. Hartshorn	1 00
Roxbury Russet:	
First, C. F. Boyden	3 00
Second, C. L. Hartshorn	2 00
Third, Joshua C. Stone	1 00
Tolman's Sweet:	
First, Mrs. A. S. Underwood	3 00
Tompkins King:	
First, George C. Rice	3 00
Any other variety:	
First, Mrs. A. S. Underwood, Yellow Bellflower	3 00
Second, John Parker, Yellow Bellflower	2 00
Third, C. F. Boyden	1 00
PEARS.—Angouleme:	
First, F. W. Damon	4 00
Second, Warren Fenno	3 00

Anjou:	
First, William Milman	4 00
Second, A. T. Brown	3 00
Third, A. K. Gould	2 00
Fourth, J. Cunning	1 00
Clairgeau:	
First, F. W. Damon	3 00
Second, Warren Fenno	2 00
Third, Charles F. Curtis	1 00
Comice:	
First, A. T. Brown	4 00
Second, J. Cunning	3 00
Third, Warren Fenno	2 00
Fourth, M. W. Chadbourne	1 00
Dana's Hovey:	
First, F. W. Damon	4 00
Second, A. T. Brown	3 00
Third, J. Cunning	2 00
Fourth, George V. Fletcher	1 00
Diel:	
First, M. W. Chadbourne	5 00
Second, C. E. Swain	2 00
Glout Morceau:	
First, E. A. Hall	3 00
Second, Mrs. A. A. Johnson	2 00
Third, Warren Fenno	1 00
Josephine of Malines:	
First, Warren Fenno	3 00
Second, John L. Bird	2 00
Langelier:	
First, Warren Fenno	3 00
Second, M. W. Chadbourne	2 00
Lawrence:	
First, F. W. Damon	3 00
Second, A. T. Brown	2 00
Third, M. W. Chadbourne	1 00
Vicar:	
First, E. S. Converse	3 00
Second, J. M. Swett	2 00
Third, A. T. Brown	1 00
Winter Nelis:	
First, A. T. Brown	3 00
Second, J. Cunning	2 00
Third, E. A. Hall	1 00
Any other variety:	
First, George V. Fletcher, Bosc	3 00

Second, Warren Fenno, Duchess of Bordeaux	2 00
Third, C. D. Frisbee, Sheldon	1 00
FOREIGN GRAPES.— Any variety:	
First, Mrs. J. C. Whitin, Alicante	5 00
Second, H. Dumaresq	4 00
Third, Daniel Brown	3 00
Gratuities: —	
J. G. Masters, Collection of Apples	5 00
L. J. Fosdick, Cranberries	2 00
Rev. Calvin Terry, "	1 00

George McWilliam, New Foreign Grape, Appley Towers, First Class Certificate of Merit.

E. W. WOOD,
CHARLES F. CURTIS,
O. B. HADWEN,
WARREN FENNO,
SAMUEL HARTWELL,
J. WILLARD HILL,
SUMNER COOLIDGE,
Committee on Fruits.

REPORT

OF THE

COMMITTEE ON VEGETABLES,

FOR THE YEAR 1899.

By WARREN HOWARD HEUSTIS, CHAIRMAN.

Notwithstanding an extremely dry season the quality and quantity of the Vegetable exhibits have been fully up to the usual high standard, which proves in a great measure that the intensive gardeners of today are not as great sufferers from the elements as formerly, many of them having very complete water systems. But even with irrigation, the results are not as satisfactory as when crops are watered from the heavens. There have been some new exhibitors and most of the old ones still keep the interest from flagging. At the Saturday exhibitions during the winter the vegetables have been quite plenty and varied; the principal prize winners have been George D. Moore, C. L. Hartshorn, Joshua C. Stone, Hon. Aaron Low, Arthur F. Coolidge, James Comley, and Warren Heustis & Son. The competition has been quite close in most cases.

March 11, A. W. Crockford brought some mushrooms which were considered by many to be the finest specimens ever shown here. At the Spring Exhibition there was a large showing of all kinds, the Lettuce from Wyman Brothers, Mushrooms from A. W. Crockford, Rhubarb from George D. Moore, and Tomatoes from S. J. Goddard, deserving special mention as also the fine collection of fifty-two varieties of Potatoes from Hon. Aaron Low. The first Asparagus was shown by C. L. Hartshorn the 6th of May, and on

the 7th of June, F. Leith, gardener for Francis Blake had the first Peas. The vegetables at the Rose and Strawberry Show were very fine; the principal exhibitors were A. F. Coolidge, C. L. Hartshorn, George D. Moore, and Warren Heustis & Son.

The weekly shows during the year have been very well sustained. The native Mushrooms have been rather meagre, presumably on account of the dry weather.

At the Annual Exhibition the Lower Hall was completely filled with vegetables, which for quality were above the average. The specimens of Potatoes shown were very smooth, and we think the quality has been very good all through the season. The Silver Medal for New Seedling Potatoes was awarded this year for the first time in several years, Hon. Aaron Low being the recipient. The Culinary Herbs made a very interesting and instructive feature of this show. On October 2, A. W. Crockford had a new Cucumber which he has called Crockford's Columbia. It is a cross between Zion House and White Spine. It resembles the White Spine on the outside, but is very solid and has few seeds, and the keeping qualities are very good indeed. The Committee thought very favorably of it and awarded it a First Class Certificate of Merit.

There have been but few changes in the Schedule for the coming year.

The amount appropriated for prizes and gratuities for 1899 was	$1,200
Amount awarded	1,180
Leaving a balance of	$20

out of which a Medal and two Certificates of Merit are to be paid for.

For the Committee,

WARREN H. HEUSTIS,
Chairman.

PRIZES AND GRATUITIES AWARDED FOR VEGETABLES.

1899.

JANUARY 7.

RADISHES.— Four bunches of any variety:	
First, Arthur F. Coolidge	$3 00
Second, C. L. Hartshorn	2 00
Third, Joshua C. Stone	1 00
CAULIFLOWERS.— Four heads:	
First, Joshua C. Stone	3 00
CELERY.— Four roots:	
First, A. F. Coolidge	3 00
Second, C. L. Hartshorn	2 00
Third, Warren Heustis & Son	1 00
LETTUCE.— Four heads:	
First, A. F. Coolidge	3 00
Second, George D. Moore	2 00
PARSLEY.— Two quarts:	
First, W. N. Craig	2 00
Second, W. N. Craig	1 00
MUSHROOMS.— Twenty-four specimens:	
First, E. S. Converse	3 00
TOMATOES.— Twelve specimens:	
First, C. A. Learned	3 00
Second, Francis Blake	2 00
Third, William C. Winter	1 00
Gratuities: —	
James Comley, Rhubarb	1 00
W. Heustis & Son, Celery	1 00
C. L. Hartshorn, Collection	3 00
Arthur F. Coolidge, "	1 00

JANUARY 14.

Gratuity: —	
A. F. Coolidge, Collection	2 00

JANUARY 21.

Gratuity: —	
A. F. Coolidge, Collection	1 00

JANUARY 28.

Gratuities: —	
George D. Moore, Lettuce	1 00

A. F. Coolidge, Collection	1 00
Warren Heustis & Son, Collection	1 00

FEBRUARY 4.

RADISHES.— Four bunches:	
First, A. F. Coolidge	2 00
Second, C. L. Hartshorn	1 00
SALSIFY.— Twelve specimens:	
Second, W. Heustis & Son	2 00
Third, C. L. Hartshorn	1 00
CELERY.— Four roots:	
First, C. L. Hartshorn	3 00
Second, W. Heustis & Son	2 00
Third, A. F. Coolidge	1 00
LETTUCE.— Four heads:	
First, C. L. Hartshorn	3 00
Second, George D. Moore	2 00
Third, A. F. Coolidge	1 00
MUSHROOMS.— Twenty-four specimens:	
First, E. O. Orpet	3 00
Second, James Comley	2 00
RHUBARB.— Twelve stalks:	
First, James Comley	3 00
Second, E. O. Orpet	2 00
TOMATOES.— Twelve specimens:	
First, W. C. Winter, Stone	3 00
Second, W. C. Winter, Chemin	2 00
Third, W. C. Winter, May's Favorite	1 00
Gratuities: —	
C. A. Learned, Beets	1 00
W. Heustis & Son, Collection	1 00

FEBRUARY 18.

Gratuities: —	
James Comley, Rhubarb	1 00
Norris F. Comley, Radishes	1 00

FEBRUARY 25.

Gratuities:—	
A. F. Coolidge, Collection	1 00
N. F. Comley, "	1 00

MARCH 11.

Gratuity: —	
A. W. Crockford, Mushrooms	1 00

SPRING EXHIBITION.

MARCH 21, 22, 23 and 24.

William J. Walker Fund.

RADISHES.— Turnip Rooted, four bunches:	
First, A. F. Coolidge	2 00
Second, C. L. Hartshorn	1 00
Long Scarlet:	
First, H. R. Kinney	2 00
CUCUMBERS.— White Spine, pair:	
First, E. M. Bruce	3 00
SPINACH.—Half-peck:	
First, Hon. Aaron Low	2 00
DANDELIONS.— Peck:	
First, C L. Hartshorn	3 00
LETTUCE.— Four heads:	
First, Wyman Brothers	3 00
Second, D. L. Tappan	2 00
Third, C. L. Hartshorn	1 00
WATER CRESS.— Two quarts:	
First, C. L. Hartshorn	2 00
Second, A. F. Coolidge	1 00
PARSLEY.— Two quarts:	
First, W. N. Craig	2 00
Second, W. N. Craig	1 00
MUSHROOMS.— Twenty-four specimens:	
First, A. W. Crockford	3 00
Second, Mrs. B. P. Cheney	2 00
Third, E. S. Converse	1 00
RHUBARB.— Twelve stalks:	
First, George D. Moore	3 00
Second, Wyman Brothers	2 00
Third, George Sanderson	1 00
TOMATOES.— Twelve specimens:	
First, S. J. Goddard	3 00
Second, Francis Blake	2 00
Third, William C. Winter	1 00
Gratuities:—	
Wyman Brothers, Mushrooms	1 00
Aaron Low, Collection of fifty-two varieties of Potatoes, First Class Certificate of Merit and $5.	
C. L. Hartshorn, Collection	2 00
A. F. Coolidge, "	1 00
W. Heustis & Son "	1 00

APRIL 1.

CUCUMBERS.— White Spine, pair:

First, E. M. Bruce	3 00

Gratuities: —

Hon. Aaron Low, Spinach	1 00
A. F. Coolidge, Collection	1 00

APRIL 8.

Gratuities: —

Mrs. E. M. Gill, Tomatoes	1 00
Hon. Aaron Low, Collection	1 00
George D. Moore "	1 00

APRIL 15.

Gratuities: —

Warren Heustis & Son, Lettuce	1 00
Estate of John Jeffries, Parsley	1 00
George D. Moore, Collection	1 00

APRIL 22.

Gratuities: —

Hon. Aaron Low, Spinach	1 00
Mrs. E. M. Gill, Tomatoes	1 00
Mrs. B. P. Cheney, Mushrooms	1 00
George D. Moore, Collection	1 00

APRIL 29.

Gratuities: —

Mrs. E. M. Gill, Tomatoes	1 00
George D. Moore, Collection	1 00
Warren Heustis & Son, Collection	1 00

MAY 6.

William J. Walker, Fund.

ASPARAGUS.— Four bunches:

First, C. L. Hartshorn	3 00

CUCUMBERS.— White Spine, pair:

First, Arthur F. Coolidge	3 00
Second, E. M. Bruce	2 00
Third, Wyman Brothers	1 00

SPINACH.— Peck:

First, Hon. Aaron Low	3 00
Second, C. L. Hartshorn	2 00
Third, Hon. Aaron Low	1 00

DANDELIONS.— Peck:	
First, W. Heustis & Son	2 00
Second, A. F. Coolidge	1 00
LETTUCE.— Four heads:	
First, C. L. Hartshorn	3 00
Second, George D. Moore	2 00
Third, A. F. Coolidge	1 00
RHUBARB.— Twelve stalks:	
First, Warren Heustis & Son	2 00
Second, A. F. Coolidge	1 00
TOMATOES.— Twelve specimens:	
First, Francis Blake, Best of All	3 00
Second, Francis Blake, Essex	2 00
Third, E. M. Bruce, "	1 00

Gratuities: —

George D. Moore, Collection	1 00
A. F. Coolidge, "	1 00
W. Heustis & Son, "	1 00
Hon. Aaron Low, "	1 00
W. N. Craig, "	1 00

MAY 13.

Gratuities: —

Norris F. Comley, Asparagus	1 00
George D. Moore, Collection	2 00
C. L. Hartshorn, "	2 00
W. Heustis & Son, "	2 00

MAY 20.

Gratuities: —

George D. Moore, Collection	1 00
Mrs. E. M. Gill, "	1 00
W. Heustis & Son, "	1 00
C. L. Hartshorn, "	1 00
Norris F. Comley, "	1 00

MAY 27.

Gratuities: —

William H. Hunt, Asparagus	1 00
Mrs. E. M. Gill, Tomatoes	1 00
Hon. Aaron Low, Collection	1 00
George D. Moore, "	1 00
W. Heustis & Son, "	1 00

RHODODENDRON SHOW.

JUNE 7 AND 8.

Theodore Lyman Fund.

BEETS.— Twelve specimens, any variety:	
First, H. R. Kinney	3 00
Second, C. L. Hartshorn	2 00
Third, George D. Moore	1 00
CARROTS.— Short Scarlet, twelve specimens:	
First, H. R. Kinney,	3 00
Second, C. L. Hartshorn	2 00
RADISHES.— Turnip rooted, four bunches:	
First, C. L. Hartshorn	2 00
Second, George D. Moore	1 00
Long Scarlet, four bunches:	
First, George D. Moore	2 00
Second, Wyman Brothers	1 00
ASPARAGUS.— Four bunches:	
First, William H. Hunt	3 00
Second, Norris F. Comley	2 00
Third, C. L. Hartshorn	1 00
CUCUMBERS.— Pair:	
First, George D. Moore	3 00
Second, Wyman Brothers	2 00
Third, H. R. Kinney	1 00
LETTUCE.— Four heads:	
First, Estate of Hon. Joseph S. Fay	3 00
Second, Warren Heustis & Son	2 00
Third, George D. Moore	1 00
RHUBARB.— Twelve stalks:	
First, Warren Heustis & Son	3 00
Second, Hon. Aaron Low	2 00
Third, Joshua C. Stone	1 00
Gratuities: —	
Mrs. E. M. Gill, Tomatoes	1 00
W. C. Winter, "	1 00
Wyman Brothers, Collection	2 00
George D. Moore, "	2 00
C. L. Hartshorn, "	2 00
Francis Blake, "	1 00
W. Heustis & Son, "	1 00

ROSE AND STRAWBERRY SHOW.

JUNE 22 AND 23.

BEETS.—Summer Turnip Rooted, twelve specimens:	
First, Arthur F. Coolidge	5 00
Second, C. L. Hartshorn	2 00
Third, Joshua C. Stone	1 00
ONIONS.—Twelve specimens:	
First, W. N. Craig	3 00
Second, Wyman Brothers	2 00
Third, George D. Moore	1 00
CUCUMBERS.—White Spine, pair:	
First, Arthur F. Coolidge	3 00
Second, George D. Moore	2 00
Third, Warren Heustis & Son	1 00
Any other variety:	
First, George D. Moore, Eureka	3 00
Second, George D. Moore, Emerald	2 00
CABBAGES.—Three of any variety, trimmed:	
First, Warren Heustis & Son, All Seasons	3 00
Second, Warren Heustis & Son, Early Summer	2 00
Third, George D. Moore, Early Summer	1 00
LETTUCE.—Tennisball, four heads:	
First, George D. Moore	3 00
Second, Warren Heustis & Son	2 00
Third, C. L. Hartshorn	1 00
Any other variety:	
First, E. C. Lewis, Deacon	3 00
Second, Estate of John Jeffries, Deacon	2 00
Third, George D. Moore, Sensation	1 00
PEAS.—Any variety, half-peck:	
First, H. R. Kinney	3 00
Second, George D. Moore	2 00
Third, C. L. Hartshorn	1 00

Gratuities:—

E. C. Lewis, Collection	1 00
Hon. Aaron Low, "	1 00
Estate of John Jeffries, Collection	1 00
Warren Heustis & Son, "	1 00
William C. Winter, "	1 00
George D. Moore, "	1 00
Sumner Coolidge, "	1 00
C. L. Hartshorn, "	1 00

JULY 1.

POTATOES.— Twelve specimens:	
First, George D. Moore, Early Bovee	3 00
Second, E. C. Lewis, Bliss's Triumph	2 00
Third, C. L. Hartshorn, Early Fortune	1 00
ONIONS.— Twelve specimens:	
First, Wyman Brothers	2 00
Second, George D. Moore	1 00
SQUASHES.— Long Warted, four:	
First, Joshua C. Stone	3 00
Second, Sumner Coolidge	2 00
Third, C. L. Hartshorn	1 00
Scalloped:	
First, Joshua C. Stone	2 00
Second, Sumner Coolidge	1 00
CABBAGES.— Three of any variety, trimmed:	
First, Warren Heustis & Son, Succession	3 00
Second, George D. Moore, "	2 00
Third, Warren Heustis & Son, No. 2	1 00
BEANS.— Half-peck of Golden Wax:	
First, Sumner Coolidge	3 00
Second, Joshua C. Stone	2 00
Third, I. E. Coburn	1 00
Half-peck of any other variety:	
First, George D. Moore, Davis	3 00
Second, I. E. Coburn, Cranberry	2 00
Third, Arthur F. Coolidge, Mohawk	1 00
PEAS.— American Wonder, half-peck:	
First, E. C. Lewis	3 00
Second, C. L. Hartshorn	2 00
Advancer:	
First, C. L Hartshorn	3 00
Second, George B. Gill	2 00
Any other variety:	
First, C. L. Hartshorn, Telephone	3 00
Second, E. C. Lewis, Prosperity	2 00
Third, W. Warburton, Carter's Daisy	1 00
Gratuity: —	
W. Warburton, Collection	1 00

JULY 8.

CABBAGES.— Three Drumhead, trimmed:	
First, Warren Heustis & Son	3 00
Second, George D. Moore	2 00

Beans.— Half-peck of Cranberry:	
First, I. E. Coburn	3 00
Second, Joshua C. Stone	2 00
Sweet Corn.— Twelve ears:	
First, Sumner Coolidge, Cory	3 00
Second, Joshua C. Stone, "	2 00
Tomatoes.— Open culture:	
First, Sumner Coolidge, Atlantic	3 00
Second, Arthur F. Coolidge, "	2 00
Third, W. N. Craig, Essex	1 00
Gratuities: —	
Estate of Hon. Joseph S. Fay, Potatoes	1 00
George D. Moore, Collection	1 00
W. Heustis & Son, "	1 00
W. Warburton, "	1 00
E. C. Lewis, "	1 00
Arthur F. Coolidge "	1 00
C. L. Hartshorn, "	1 00

July 15.

Potatoes.— Twelve specimens of any variety:	
First, J. Burns, Early Northern	3 00
Second, Hon. Aaron Low, Early Fortune	2 00
Third, Estate of Hon. J. S. Fay, Hebron	1 00
Lettuce.— Tennisball, four heads:	
First, Sumner Coolidge	2 00
Second, C. L. Hartshorn	1 00
Any other variety:	
First, C. L. Hartshorn	2 00
Second, Warren Heustis & Son	1 00
Peas.— Stratagem, half-peck:	
First, C. L. Hartshorn	3 00
Second, Hon. Aaron Low	2 00
Any other variety:	
First, C. L. Hartshorn, Telephone	3 00
Second, Hon. Aaron Low "	2 00
Sweet Corn.— Twelve ears of any variety:	
First, Sumner Coolidge, Crosby	3 00
Second, Sumner Coolidge, Hybrid	2 00
Third, Joshua C. Stone, Cory	1 00
Tomatoes.— Twelve specimens:	
First, Sumner Coolidge	3 00
Second, Joshua C. Stone	2 00
Third, Arthur F. Coolidge	1 00

JULY 22.

POTATOES.— Any variety, twelve specimens:

First, J. W. Burns	3 00
Second, F. J. Kinney	2 00
Third, Hon. Aaron Low	1 00

SQUASHES.— Three Marrow:

First, Warren Heustis & Son	3 00

SWEET CORN.— Twelve ears, Crosby:

First, Hittinger Brothers	3 00
Second, Sumner Coolidge	2 00

Any other variety:

First, Joshua C. Stone, Quincy Market	3 00

TOMATOES.— Twelve specimens:

First, Hittinger Brothers, Stone	3 00
Second, Sumner Coolidge, "	2 00
Third, Joshua C. Stone, "	1 00

MUSHROOMS.— Not less than five edible varieties:

Second, Miss Alice L. Grinnell	3 00

Gratuities: —

C. A. Berg, Kohl Rabi	1 00
W. N. Craig, Cucumbers	1 00

JULY 29.

BEANS.— Goddard, two quarts:

First, Warren Heustis & Son	3 00
Second, I. E. Coburn	2 00
Third, David L. Fiske	1 00

Horticultural:

First, David L. Fiske	3 00
Second, C. L. Hartshorn	2 00
Third, Sumner Coolidge	1 00

TOMATOES.— Comrade, twelve specimens:

First, Arthur F. Coolidge	3 00
Second, I. E. Coburn	2 00
Third, Hon. Aaron Low	1 00

Stone:

First, Francis Blake	3 00
Second, Hittinger Brothers	2 00
Third, E. N. Pierce	1 00

Any other variety:

First, Hittinger Brothers, Hybrid	3 00
Second, Warren Heustis & Son, Hybrid	2 00
Third, Sumner Coolidge, Atlantic	1 00

EGG PLANTS.— Round Purple, four:

First, Arthur F. Coolidge	3 00

Second, Joshua C. Stone	2 00
Third, Sumner Coolidge	1 00

Gratuities: —

Hon. Aaron Low, Potatoes	1 00
J. W. Burns, "	1 00
Joshua C. Stone, Melons	1 00
Warren Heustis & Son, Collection	1 00
E. C. Lewis, "	1 00

AUGUST. 5.

GREEN FLESH MELONS.— Four specimens:	
First, Arthur F. Coolidge	3 00
Second, C. L. Hartshorn	2 00
Third, Joshua C. Stone	1 00
SALMON FLESH MELONS.— Four specimens:	
First, C. L. Hartshorn	3 00
Third, Joshua C. Stone	1 00
SWEET CORN.— Twelve ears:	
First, I. E. Coburn, Potter's Excelsior	3 00
Second, Oliver R. Robbins, Kendall's Giant	2 00
Third, Sumner Coolidge, Potter's Excelsior	1 00
EGG PLANTS.— Round Purple, four:	
First, Arthur F. Coolidge	3 00
Second, Sumner Coolidge	2 00
Third, Norris F. Comley	1 00

Gratuities: —

George F. Stone, Collection	1 00
Hon. Aaron Low, "	1 00

AUGUST 12.

POTATOES.— Twelve specimens of any variety:	
First, E. C. Lewis, Thoroughbred	3 00
Second, J. W. Burns, Early Northern	2 00
Third, Hon. Aaron Low, Early Fortune	1 00
ONIONS.— Twelve specimens:	
First, E. C. Lewis, Prize Taker	3 00
Second, Sumner Coolidge, Danvers	2 00
Third, W. N. Craig, Danvers	1 00
GREEN FLESH MELONS.— Four specimens:	
First, Arthur F. Coolidge	3 00
Second, C. L. Hartshorn	2 00
Third, Joshua C. Stone	1 00

SALMON FLESH MELONS.— Any variety, four specimens:

First, Varnum Frost	3 00
Second, George D. Moore	2 00
Third, Joshua C. Stone	1 00

CELERY.— Four roots of any variety:

First, Arthur F. Coolidge	3 00
Second, W. N. Craig	2 00
Third, Warren Heustis & Son	1 00

BEANS.— Small Lima, two quarts:

First, Sumner Coolidge	3 00

Goddard:

First, Warren Heustis & Son	3 00
Second, C. L. Hartshorn,	2 00
Third, Hon. Aaron Low	1 00

SWEET CORN.— Potter's Excelsior, twelve ears:

First, I. E. Coburn	3 00
Second, E. C. Lewis	2 00
Third, Oliver R. Robbins	1 00

Any other variety:

First, E. C. Lewis, Crosby	3 00
Second, Joshua C. Stone, Bear's Foot	2 00
Third, Joshua C. Stone, Crosby	1 00

PEPPERS.— Squash, twelve specimens:

First, Arthur F. Coolidge	3 00
Second, George Lincoln	2 00
Third, Hon. Aaron Low	1 00

Any other variety:

First, E. C. Lewis, Ruby King	3 00
Second, Joseph Thorp, "	2 00
Third, C. L. Hartshorn, "	1 00

Gratuities: —

Mrs. E. M. Gill, Tomatoes	1 00
E. C. Lewis, Collection	2 00
W. H. Burlen, "	1 00
C. A. Berg, "	1 00
W. Heustis & Son, "	1 00

AUGUST 19.

GREEN FLESH MELONS.— Four specimens:

First, C. L. Hartshorn	3 00
Second, Joshua C. Stone	2 00
Third, Arthur F. Coolidge	1 00

SALMON FLESH MELONS.— Four specimens:

First, George D. Moore	3 00
Second, Varnum Frost	2 00

WATERMELONS.— Pair:

First, C. L. Hartshorn	3 00

CABBAGES.— Three of any variety, trimmed:	
First, C. L. Hartshorn	3 00
CAULIFLOWERS.— Four specimens:	
First, W. S. Luscomb	3 00
Second, B. J. De Souza	2 00
CELERY.— Four roots:	
First, Arthur F. Coolidge	3 00
Second, W. N. Craig	2 00
Third, Warren Heustis & Son,	1 00
BEANS.— Large Lima, two quarts	
First, C. L. Hartshorn	3 00
Second, Sumner Coolidge	2 00
Small Lima:	
First, Oliver R. Robbins	3 00
Second, C. L. Hartshorn	2 00
MARTYNIAS.— Twelve specimens:	
First, E. S. Converse	2 00
Second, E. C. Lewis	1 00
Gratuities: —	
E. C. Lewis, Collection	2 00
W. N. Craig, "	2 00
W. Heustis & Son, "	1 00
Hon. Aaron Low, "	1 00

AUGUST 30.

Gratuity: —	
James Comley, Collection of Celery	2 00
James Comley, New London Celery, First Class Certificate of Merit	

SEPTEMBER 2.

Gratuity: —.	
Warren Heustis & Son, Celery	1 00

SEPTEMBER 9.

TURNIPS.— Flat, twelve:	
First, E. C. Lewis	3 00
Second, C. L. Hartshorn	2 00
GREEN FLESH MELONS.— Four specimens:	
First, C. L. Hartshorn	3 00
Second, Joshua C. Stone	2 00
Third, I. E. Coburn	1 00
SALMON FLESH MELONS.— Four specimens:	
First, George D. Moore	3 00
Second, Joshua C. Stone	2 00

WATERMELONS.— Two specimens:

First E. C. Lewis	3 00
Second, C. L. Hartshorn	2 00
Third, Rev. C. Terry	1 00

CAULIFLOWERS.— Four specimens:

First, B. J. De Souza	3 00
Second, William H. Teele	2 00
Third, C. M. Handley	1 00

LETTUCE. — Four heads of any variety:

First, George D. Moore, Deacon	3 00
Second, Sumner Coolidge, Tennisball	2 00
Third, George F. Stone, "	1 00

CELERY. — Four roots of any variety:

First, Arthur F. Coolidge	3 00
Second, Warren Heustis & Son	2 00
Third, C. L. Hartshorn	1 00

PARSLEY. — Two quarts:

First, W. N. Craig	2 00
Second, C. L. Hartshorn	1 00

BEANS. — Large Lima, two quarts:

First, Mrs. E. M. Gill	3 00
Second, C. M. Handley	2 00
Third, Sumner Coolidge	1 00

Small Lima:

First, E. C. Lewis	3 00
Second, Sumner Coolidge	2 00
Third, C. L. Hartshorn	1 00

CORN. — Potter's Excelsior, twelve ears:

First, I. E. Coburn	3 00
Second, E. C. Lewis	2 00
Third, Arthur F. Coolidge	1 00

Any other sweet variety:

First, E. C. Lewis	3 00
Second, C. L. Hartshorn	2 00
Third, Hon. Aaron Low	1 00

EGG PLANTS.— Round Purple, four:

First, Arthur F. Coolidge	3 00
Second, Sumner Coolidge	2 00
Third, Norris F. Comley	1 00

TOMATOES.— Three varieties, twelve specimens each:

First, Hon. Aaron Low	5 00
Second, Varnum Frost	4 00
Third, Arthur F. Coolidge	3 00

Aristocrat, twelve:

First, Joseph Thorp	3 00
Second, Hon. Aaron Low	2 00
Third, Varnum Frost	1 00

Comrade:	
First, Hon. Aaron Low	3 00
Second, Arthur F. Coolidge	2 00
Third, Joshua C. Stone	1 00
May's Favorite:	
First, Hon. Aaron Low	3 00
Second, Varnum Frost	2 00
Third, W. N. Craig	1 00
Any other variety:	
First, Joseph Thorp, Stone	3 00
Second, Hittinger Brothers, Stone	2 00
Third, Varnum Frost, "	1 00
MARTYNIAS.—Twelve specimens:	
First, Sumner Coolidge,	2 00
Second, E. C. Lewis	1 00
OKRA.—Twelve specimens:	
First, E. C. Lewis	2 00
Second, E. C. Lewis	1 00
PEPPERS.—Squash, twelve specimens:	
First, George Lincoln	2 00
Second, E. C. Lewis	1 00
Any other variety:	
First, C. L. Hartshorn, Ruby King	2 00
Second, E. C. Lewis, " "	1 00
Gratuities:—	
Warren Heustis & Son, Collection	2 00
E. C. Lewis, "	2 00
Hon. Aaron Low, "	2 00
W. N. Craig, "	1 00

SEPTEMBER 16.

Gratuities:—	
Mrs. G. Duncan, Collection	1 00
Warren Heustis & Son, "	1 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

SEPTEMBER 28 AND 29.

Special Prizes.

POTATOES.—New Seedlings, best collection:
Hon. Aaron Low, Silver Medal.

Regular Prizes.

BEETS.—Turnip Rooted, twelve:	
First, E. C. Lewis	3 00

Second, Joshua C. Stone	2 00
Third, W. Warburton	1 00
CARROTS.— Long Orange, twelve:	
First, E. C. Lewis	3 00
Second, W. Warburton	2 00
Third, C. L. Hartshorn	1 00
Intermediate, twelve:	
First, W. Warburton	3 00
Second, E. C. Lewis	2 00
Third, W. A. Donnell	1 00
PARSNIPS.— Long, twelve:	
First, Warren Heustis & Son	3 00
Second, George D. Moore	2 00
Third, E. C. Lewis	1 00
POTATOES.— Four varieties, twelve specimens each:	
First, C. H. Thomas	5 00
Second, F. J. Kinney	4 00
Third, H. R. Kinney	3 00
Carman No. 1:	
First, C. H. Thomas	3 00
Second, Hon. Aaron Low	2 00
Clark:	
First, C. H. Thomas	3 00
Second, Hon. Aaron Low	2 00
Third, F. J. Kinney	1 00
Hebron:	
First, H. R. Kinney	3 00
Second, F. J. Kinney	2 00
Third, C. H. Thomas	1 00
Rose:	
First, C. H. Thomas	3 00
Second, F. J. Kinney	2 00
Third, H. E. Rich	1 00
Any other variety:	
First, F. J. Kinney, Early Bovee	3 00
Second, E. C. Lewis, Somerset	2 00
Third, C. H. Thomas, Sir Walter Raleigh	1 00
SALSIFY.—Twelve specimens:	
First, Warren Heustis & Son	3 00
Second, D. L. Tappan	2 00
Third, W. Warburton	1 00
TURNIPS.— Flat, twelve:	
First, Wilfred Wheeler	3 00
Second, George F. Wheeler	2 00
Third, F. J. Kinney	1 00

Swedish:	
First, E. C. Lewis	3 00
Second, E. C. Lewis	2 00
Third, C. L. Hartshorn	1 00
ONIONS.— Danvers, twelve:	
First, B. P. Winch	3 00
Second, W. N. Craig	2 00
Third, C. L. Hartshorn	1 00
Red:	
First, W. N. Craig	3 00
Second, C. L. Hartshorn	2 00
Third, E. C. Lewis	1 00
White:	
First, C. L. Hartshorn	2 00
Second, Sumner Coolidge	1 00
Any other variety:	
First, E. C. Lewis, Prize Taker	3 00
Second, W. N. Craig, "	2 00
Third, C. L. Hartshorn "	1 00
SQUASHES.— Bay State, three:	
First, Joshua C. Stone	3 00
Second, C. L. Hartshorn	2 00
Third, E. C. Lewis	1 00
Hubbard:	
First, C. L. Hartshorn	3 00
Second, Joshua C. Stone	2 00
Third, Arthur F. Coolidge	1 00
Hybrid Turban:	
First, E. C. Lewis	3 00
Second, C. L. Hartshorn	2 00
Third, George N. Lincoln	1 00
Marblehead:	
First, E. C. Lewis	3 00
Second, C. L. Hartshorn	2 00
Marrow:	
First, E. C. Lewis	3 00
Second, Arthur F. Coolidge	2 00
Third, Hon. Aaron Low	1 00
Any other variety:	
First, C. L. Hartshorn	3 00
Second, Hon. Aaron Low	2 00
Third, Warren Heustis & Son	1 00
CUCUMBERS.— White Spine, pair:	
First, W. N. Craig	3 00
Second, Joshua C. Stone	2 00

Any other variety:

First, W. N. Craig	3 00
Second, Hon. Aaron Low	2 00

GREEN FLESH OR SALMON FLESH MELONS.— Four specimens:

First, C. L. Hartshorn	3 00
Second, George D. Moore	2 00
Third, C. L. Hartshorn	1 00

WATERMELONS.— Two specimens:

First, E. C. Lewis	3 00
Second, Hon. Aaron Low	2 00
Third, C. L. Hartshorn	1 00

BRUSSELS SPROUTS.— Half-peck:

First, C. L. Hartshorn	3 00
Second, E. C. Lewis	2 00
Third, E. S. Converse	1 00

CABBAGES.— Drumhead, three, trimmed:

First, Samuel Hartwell	3 00
Second, E. C. Lewis	2 00
Third, C. L. Hartshorn	1 00

Red:

First, Samuel Hartwell	3 00
Second, E. C. Lewis	2 00
Third, B. P. Winch	1 00

Savoy:

First, B. P. Winch	3 00
Second, E. C. Lewis	2 00
Third, C. L. Hartshorn	1 00

CAULIFLOWERS.— Four specimens:

First, C. M Handley	5 00
Second, De Souza Brothers	4 00
Third, William H. Teele	3 00

CELERY.— Paris Golden, four roots, best kept during the exhibition:

First, Arthur F. Coolidge	5 00
Second, Warren Heustis & Son	4 00
Third, C. L. Hartshorn	3 00

Any other variety:

First, Warren Heustis & Son, Pascal	5 00
Second, A. Nixon, White Plume	4 00
Third, W. N. Craig, "	3 00

ENDIVE.— Four specimens:

First, C. L. Hartshorn	3 00
Second, E. C. Lewis	2 00
Third, E. C. Lewis	1 00

LETTUCE.— Four heads:

First, George D. Moore	3 00
Second, Warren Heustis & Son	2 00

Third, C. L. Hartshorn	1 00
PARSLEY.— Two quarts:	
First, W. N. Craig	2 00
Second, C. L. Hartshorn	1 00
HORSERADISH.— Six roots, present year's growth:	
First, H. R. Kinney	2 00
Second, W. Warburton	1 00
CORN.— Yellow or Field, twenty-five ears, traced:	
First, Elliott Moore	3 00
Second, H. E. Rich	2 00
Third, H. E. Rich	1 00
Sweet, twelve ears:	
First, C. L. Hartshorn	3 00
Second, E. C. Lewis	2 00
Third, E. C. Lewis	1 00
EGG PLANTS.— Round Purple, four:	
First, Arthur F. Coolidge	3 00
Second, C. L. Hartshorn	2 00
Third, Sumner Coolidge	1 00
TOMATOES.— Three varieties, twelve specimens each:	
First, Varnum Frost	4 00
Second, Arthur F. Coolidge	3 00
Third, W N. Craig	2 00
Aristocrat:	
First, Joseph Thorp	3 00
Second, E. M. Bruce	2 00
Third, Varnum Frost	1 00
May's Favorite:	
First, Warren Heustis & Son	3 00
Second, B. P. Winch	2 00
Third, W. N. Craig	1 00
Stone:	
First, Hon. Aaron Low	3 00
Second, Varnum Frost	2 00
Third, B. P. Winch	1 00
Any other variety:	
First, Joseph Thorp, Combination	3 00
Second, W. Warburton, Matchless	2 00
Third, Arthur F. Coolidge, Perfection	1 00
PEPPERS.— Squash, twelve specimens:	
First, George W. Jameson	3 00
Second, Hon. Aaron Low	2 00
Any other variety:	
First, C. L. Hartshorn	3 00
Second, Joseph Thorp	2 00
Third, A. Nixon	1 00

CULINARY HERBS, GREEN.— Collection, named:	
First, W. N. Craig	5 00
Second, C. L. Hartshorn	4 00
Third, W. Warburton	3 00
Gratuities: —	
C. L. Hartshorn, Collection	5 00
W. N. Craig, "	5 00
W. Heustis & Son, "	5 00
E. C. Lewis, "	3 00
George D. Moore, "	2 00
W. Warburton, "	2 00
Hon. Aaron Low, "	2 00
George F. Stone, "	1 00
B. P. Winch, "	1 00

OCTOBER 21.

Gratuities: —	
Warren Heustis & Son, Celery	1 00
Hon. Aaron Low, Turnips	1 00
A. W. Crawford, New Cucumber, Crockford's Columbia, First Class Certificate of Merit.	

OCTOBER 28.

Gratuity: —	
Warren Heustis & Son, Salsify	1 00

NOVEMBER 4.

Gratuities: —	
George D. Moore, Lettuce	1 00
Warren Heustis & Son, Celery	1 00

EXHIBITION OF WINTER FRUITS AND VEGETABLES.

NOVEMBER 18.

PARSNIPS.— Twelve specimens:	
First, Warren Heustis & Son	3 00
Second, George D. Moore	2 00
Third, D. L. Tappan	1 00
CUCUMBERS. — Pair:	
First, Joshua C. Stone	3 00
Second, C. A. Learned	2 00
Third, Mrs. John L. Gardner	1 00
CABBAGES.— Red, three:	
First, C. L. Hartshorn	3 00
Savoy:	
First, Joshua C. Stone	3 00
Second, C. L. Hartshorn	2 00

BRUSSELS SPROUTS. — Half peck:	
First, H. Dumaresq	3 00
Second, Mrs. John L. Gardner	2 00
Third, C. L. Hartshorn	1 00
CAULIFLOWERS. — Four specimens:	
First, C. M. Handley	3 00
CELERY. — Four roots:	
First, Warren Heustis & Son	3 00
Second, D. L. Tappan	2 00
Third, C. L. Hartshorn	1 00
LETTUCE. — Four heads:	
First, George D. Moore	3 00
TOMATOES. — Twelve specimens, grown under glass:	
First, William C. Winter	3 00
Second, Francis Blake	2 00
Third, C. A. Learned	1 00
Gratuities: —	
C. M. Handley, Cauliflowers	1 00
D. L. Tappan, Salsify	1 00
Hon. James J. H. Gregory, No. 7 Squash	1 00
C. L. Hartshorn, Collection	4 00
W. Heustis & Son, "	4 00
George D. Moore, "	2 00
Hon. Aaron Low, "	1 00

NOVEMBER 25.

Gratuities: —	
Joshua C. Stone, Cucumbers	1 00
Warren Heustis & Son, Collection	2 00

DECEMBER 2.

Gratuity: —	
Warren Heustis & Son, Collection	1 00

DECEMBER 16.

Gratuity: —

Charles A. Learned, Tomatoes, First Class Certificate of Merit and $1.

WARREN HOWARD HEUSTIS,
CEPHAS H. BRACKETT,
VARNUM FROST,
WALTER RUSSELL,
AARON LOW,
GEORGE D. MOORE,
JOSHUA C. STONE,
Committee on Vegetables.

REPORT

OF THE

COMMITTEE ON GARDENS,

FOR THE YEAR 1899.

By PATRICK NORTON, CHAIRMAN.

The season which is about closing has been one of great activity with your Committee. We have been called upon to visit seventeen places, all of which have been examined with pleasure both to the Committee and to the proprietors. In nearly every instance the weather has been favorable, and the excursions, thus made pleasant, have been very enjoyable. We will take the notices in their order and describe each place in as brief a manner as possible, and at the end of this report will be found a list of the prizes and gratuities awarded by your Committee.

F. A. BLAKE'S CARNATION HOUSE, ROCHDALE.

The first visit was on the 18th of April, to the estate of F. A. Blake, at Rochdale, to view a house of carnations which was filled with plants of a seedling, of a rich scarlet color, originated by Mr. Blake and named Bon Ton. The house was in fine condition, and the plants were robust and healthy and profusely flowered. The flower stems were fully eighteen inches long, upright in habit, and of strong growth. The flowers are of medium size, and command a ready sale in the market.

WILLIAM NICHOLSON'S TOMATO HOUSE, FRAMINGHAM.

The second visit was on May 11th to William Nicholson, Framingham, to inspect a house of tomatoes, principally grown on benches. The house, one hundred feet long by fifteen feet wide,

contained two hundred and fifty plants on the main bench, planted in four rows the length of the house, and about two feet apart in the rows, all planted January 1st. A careful estimate by the Committee was made, and it was agreed that the house then contained fully two tons of fruit. Everything about the houses was clean, neat, and thrifty, the whole plant presenting a prosperous appearance.

E. M. Bruce's Cucumber House, Leominster.

The third visit was to the farm of E. M. Bruce, Leominster, on May 17th, to inspect a house of cucumbers. The house was one hundred and fifty feet long by twenty feet wide, and was planted in four rows lengthwise and two feet apart in the rows. The vines were in full bearing when we saw them, and presented a very healthy and vigorous appearance although Mr. Bruce reported to us that he had already cut ten thousand cucumbers up to that time, in four months.

Mrs. David Nevins's Estate, Methuen.

The fourth visit occurred on June 9th, by the kind invitation of Mrs. David Nevins, of Methuen (formerly of South Framingham). This estate has been in the family a great many years and consists of from forty to fifty acres of land planted with a large variety of trees and shrubs, some of which are fine specimens of arboreal growth. The buildings correspond with the surroundings and are of that old-fashioned and comfortable style, which appeals to one's sense of comfort and hospitality, always to be found in those peaceful homes occupied by the descendants of old-fashioned people. Our visit to Mrs. Nevins was one of the most delightful in our recollection.

In this vicinity is Memorial Hall, which was presented to the town by the late David Nevins, and is a magnificent monument of his generosity. It contains a fine large library, a reading room and a beautiful memorial window which must have cost a great sum of money. Contiguous to the hall has been erected an appropriate monument over the grave of the late Mr. Nevins. It is a splendid work of art and will perpetuate the memory of a good man after this generation shall have passed away.

C. H. Tenney's Estate, Methuen.

While at Methuen we were invited to visit Greycourt, the magnificent estate of C. H. Tenney. This place is modern in all its appointments, and is replete with all the comforts and conveniences which can be incorporated in a wealthy man's house. The house is a magnificent stone palace, and the grounds are laid out in the most artistic manner. It is a great pleasure to see so much good taste displayed, and on such a broad scale, as is manifest on this estate.

William C. Winter's House of Foreign Grapes and House of Tomatoes, Mansfield.

The fifth visit occurred on June 15th at William C. Winter's, Mansfield, to inspect a house of foreign grapes and a house of tomatoes. The grape vines were heavily fruited but mildew had made its appearance to a considerable extent, which must be detrimental to the ripening of the fruit. The plants in the tomato house were all in pots and about six feet high, fairly well fruited, but badly infested with red spider,—so much so that the vines would not grow much more, and probably would not mature all the fruit set.

Warren H. Heustis's Strawberry Garden, Belmont.

The sixth visit was on the 16th of June, to W. H. Heustis's fruit and vegetable farm at Belmont, to inspect a strawberry garden. The plants were set in rows three feet apart, and about one foot apart in the rows. The variety was the Marshall. The plants were heavily fruited with berries of the first quality and of enormous size. The field was mulched with salt meadow hay and kept sufficiently watered to perfect the fruitage. The result was a very large yield of first-class berries, which were further appreciated by the Fruit Committee at the Annual Strawberry Show, where Mr. Heustis was awarded the first prize over all competitors.

George D. Moore's Vegetable Garden, Arlington.

June 21 we visited the estate of George D. Moore to inspect a house of cucumbers and a vegetable garden. The house of cucumbers was, in the judgment of your Committee, the best they

RESIDENCE OF ARTHUR F. ESTABROOK, BEACH BLUFF.

ever saw; and this decision was confirmed by several of the best farmers of Arlington, who had been invited to go with the Committee. The vegetable garden showed good cultivation and a thrifty appearance, notwithstanding a very dry springtime. There was not a very great variety of vegetables, but the tomatoes, beans, and peas were remarkably fine.

Sumner and Frank E. Coolidge's Vegetable Farm, Mount Auburn.

The eighth visit occurred on July 6th, and was to the vegetable farm of Sumner and Frank E. Coolidge, at Mount Auburn. This farm has the advantage of an abundant water supply, which is so well distributed all over the farm that the growing crops never get thirsty from the want of water. The past summer was a very trying one to farmers who had no adequate supply of water, but on this farm the vegetables looked as thrifty as though it rained every other day. The weather of late years is so variable that it would seem to be economy for all our early and late vegetable farmers to put in adequate irrigating plants to protect their farms from such a drought as we have had during the past summer.

Arthur F. Estabrook's Grounds, Beach Bluff.

The next visit was to the summer estate of Arthur F. Estabrook, at Beach Bluff. The estate is entered for the Hunnewell Triennial Premium, and this is the third year of inspection. The whole of the place was in splendid condition notwithstanding it was a very dry summer and trying to lawns, shrubs, and flower gardens, the flower beds, the lawn, and the shrubs and trees showed that none of them had suffered by the effects of drought. The whole place showed increased care by Mr. Barker, the gardener, and a greater degree of taste in the arrangement of flower-bed effects than formerly. The estate is beautifully situated and enjoys a splendid outlook over the ocean, making it a delightful summer home for the owner. The Committee has awarded the estate the first of the Hunnewell Triennial Premiums.

The Oliver Ames Estate, North Easton.

On August 29th we visited the Oliver Ames estate at North Easton, occupied by Oakes Ames. This estate is entered in competition for the Hunnewell Triennial Premium and this is the first

year of entry. The place is furnished with very fine stone buildings, which were erected by his father, the late governor of this state, and has the advantage of a beautiful pond which borders it on the south, with other ponds, devoted to the culture of all kinds of aquatics, in the grounds. The surface of the place is nicely undulating and is covered with various superb forest trees, all of which were planted by the late governor as to his good judgment seemed best. The trees are so far apart that each has had room enough to develop and become a fine specimen of its kind. Mr. Ames is devoting a portion of his valuable time to the improvement of our native wild flowers by hybridizing and careful cultivation. His stove and greenhouses are remarkable, for they contain a very large collection of orchids and other plants from all over the world. The whole estate was in good condition, except that the drought had partially spoiled the grass among the forest trees.

George Abbot James's Estate, Nahant.

The eleventh visit was made on September 11th, to the estate of George Abbot James, at Nahant. This was our first visit to this estate, which is entered for the Hunnewell Triennial Premium. It consists of twenty-five acres of land and rocks, and is situated at the extreme south end of this rock-bound promontory. About thirty years ago this place was a wind-swept sand dune, but now it presents to the eye a very different appearance. A walk has been constructed on the cliffs, which affords some of the grandest views to be found on this rugged coast, and when the sea is angry the water roars over the immense boulders which line the shore, in a terrific manner. The sand has been hidden by a thick coating of loam; trees, shrubs, and flower-beds have been planted and the whole place has been made to "blossom like the rose." The place has an advantage over inland estates inasmuch as the huge rocks and the never quiet sea are ever present, making this promontory a most delightful summer home.

Col. Frederick Mason's Vegetable Garden, Taunton.

We visited the estate of Col. Frederick Mason, at Taunton, on the 14th of September, to inspect his vegetable garden, which consists of about five acres and was planted with almost every

vegetable we read about in the lists yearly issued by our best seedsmen. Mr. E. C. Lewis is the gardener, and the grand appearance of the crop would indicate that good care is constantly applied, leading to successful results. Mr. Lewis is to be congratulated, as also is Colonel Mason, for it is seldom one sees a vegetable garden with such a variety of good food for the table.

Col. Charles Pfaff's Estate, South Framingham.

The fourteenth visit was to the beautiful estate of Col. Charles Pfaff, at South Framingham, to view a house of chrysanthemums planted on benches. We saw over six hundred plants flowered to one stem. There were over thirty varieties. The flowers were very large and well finished; the foliage was excellent. Some few flowers showed the effect of a week's warm weather, but otherwise the growth and flowering reflected great credit on the gardener, George Melvin.

Mrs. B. P. Cheney's Chrysanthemum Houses, Wellesley.

The next visit was on the 3rd of November to Mrs. B. P. Cheney, at Wellesley, to inspect chrysanthemums in pots and on benches. The house of chrysanthemums in pots, arranged for effect with foliage plants interspersed, gave the house a sumptuous appearance, and was by far the best house of this gorgeous flower we have ever seen. The fine hand of John Barr was shown in the arrangement, and he deserves great credit for growing such grand plants for exhibition. We append the names of all the plants in this house, and will say that each one was very symmetrical in form, magnificently flowered, and would average over six feet in diameter:

Arethusa,
Autumn Glory,
Charity,
Charles Molin,
C. H. Curtis,
Defender,
Frank Hardy,
Georgiana Pitcher,
Georgienne Bramhall,
Golden Gate,
Golden Trophy,
Iora,
Ivory,
John Shrimpton,
Lady Hanham,
Louis Boehmer,
Marion Henderson,
Mrs. E. B. Freeman,

Mrs. F. A. Constable,	Phenomenon,
Mrs. J. G. Breer,	Pink Ivory,
Mrs. H. Weeks,	Red Warrior,
Mutual Friend,	Savannah,
Onyx,	Silver Cloud,
Peter Kay,	The Bard.

The plants on benches were grown to one bloom each. They were fine stalwart plants and in the very best condition.

Edward Hatch's Estate, Wenham.

The sixteenth visit was to "The Windmill" on Lake Wenham. This estate, which has but lately come into the possession of Edward Hatch, is situated on the shore of Lake Wenham on an elevation which commands a superb outlook "over the lake and far away." It is an ideal summer home, and one which is being improved by the planting of trees and shrubs. It will be the study of the proprietor, assisted by his numerous friends, to produce an artistic and beautiful place where restful pleasure may reign supreme, and the joys of living may be appreciated by his own good self and his hosts of friends.

Edmund M. Wood & Co.'s Waban Conservatories, Natick.

The last visit of the season was made on the 13th of December to the Waban Conservatories of Edmund M. Wood & Co., at Natick. These greenhouses are of very great extent, covering several acres of ground, and were at the time of our visit filled with roses in their different stages of development. Tea and tender roses predominated and they presented a most wonderfully healthy and vigorous appearance. Some of the houses were planted out in July last, and others contained plants which had been planted from one to three years. The houses face the south, are span roofed, and range from one hundred feet by twenty up to three hundred and fifty-five by twenty-four feet. Most all the tender roses were Brides and Bridesmaids, and they were coming into bloom very profusely.

The particular object of our visit was to examine a new house, three hundred feet long by twenty-four feet wide, planted in July last, with three thousand plants of the celebrated American Beauty

rose. This rose was discovered in General Bancroft's grounds at Washington some years ago, and it has proved of such superior excellence in size, color, and fragrance that it is grown by all our rosarians in the varied forms of perfection, as their knowledge of its wants extends. It would seem that Mr. Wood's head gardener, Alexander Montgomery, had conquered every obstacle in growing this rose to the limit of perfection, for this house presented the highest type of luxurious beauty ever seen by your Committee. The plants had each sent up on an average five stalks of flowers which would measure from four to six feet high, and with luxuriant foliage and not a speck of mildew in any of the houses. The knowledge of growing roses finely is not all confined to this estate, for nearly all the gardeners who have graduated from Mr. Montgomery's tuition have gone forth and put into practice the knowledge they have acquired while working in this magnificent establishment. Yet, when they attempt this task, they do not seem to have the knack that Mr. Montgomery possesses of putting on that fine finish and lusty appearance which culminates under his personal supervision.

This whole plant is run by four boilers, embodying four hundred and fifty horse power, with a further reserve of two other boilers in case of need. The annual amount of coal consumed is one thousand two hundred tons. Not content with this enormous plant as it now stands, and now turning out thousands of roses every day, Mr. Wood is about erecting two other greenhouses, each seven hundred feet in length, so as to enable him to produce a few more roses. We award the Waban Conservatories the first prize for a rose house.

The prizes awarded this year are as follows:

H. H. Hunnewell Triennial Premiums:

For an estate of not less than three acres, which shall be laid out with the most taste, planted most judiciously, and kept in the best order for three consecutive years:

First, A. F. Estabrook $160 00

Special Prize from the John A. Lowell Fund.

For the best house of Chrysanthemums arranged for effect, with other plants, in pots:

First, Mrs. B. P. Cheney 40 00

For the best house of Chrysanthemums grown on benches:	
First, Col. Charles Pfaff	30 00

Society's Prizes.

For the best house of Foreign Grapes:	
Second, William C. Winter	20 00
For the best house of Carnations:	
First, F. A. Blake	30 00
For the best house of Roses:	
First, Edmund M. Wood & Co.	40 00
For the best Vegetable Garden:	
First, Col. Frederick Mason	30 00
Second, S. & F. E. Coolidge	20 00
For the best house of Cucumbers:	
First, George D. Moore	30 00
Second, E. M. Bruce	20 00
For the best house of Tomatoes:	
First, William Nicholson	30 00
Second, William C. Winter	20 00

Gratuities.

Mrs. David Nevins's estate	25 00
Warren H. Heustis, Strawberry Garden	30 00

Respectfully submitted,

PATRICK NORTON,
JOSEPH H. WOODFORD,
WM. WALLACE LUNT,
J. WOODWARD MANNING,
E. W. WOOD,
WARREN H. HEUSTIS,
HENRY W. WILSON,
JACKSON DAWSON,
Committee on Gardens.

REPORT

OF THE

Committee on School Gardens and Children's Herbariums

FOR THE YEAR 1899.

By HENRY LINCOLN CLAPP, CHAIRMAN.

One of the instructions concerning prizes for school gardens in the prize list of this Committee is this: "In determining the prizes reliance must be placed upon the descriptions of the principals in charge." Since the principal of the George Putnam School left the school for Europe two months before it closed and did not return till after November 1, he knew comparatively little about the management, condition, or use of the garden, and, accordingly, could not give a proper account of it. However, an adequate account written by Miss Katharine W. Huston, the principal's assistant, is herewith presented.

It is interesting to read that the old Quaker, George Fox, in 1691 willed a tract of land near Philadelphia "for a playground for the children of the town to play on and for a garden to plant with physical [medicinal] plants, for lads and lassies to know simples, and learn how to make oils and ointments."

It may also interest some persons to learn that on the 200th anniversary of that event (1891) the first school garden in Massachusetts was established on the grounds of the George Putnam School, Roxbury.

WILD GERANIUM

GEORGE PUTNAM SCHOOL GARDEN, ROXBURY.

The George Putnam School Garden was begun in the spring of 1891, in a small way, and for eight consecutive years has steadily increased in the number of its plants and in its usefulness to the school.

It now contains more than one hundred and fifty species of native flowering plants and ferns, some of which have propagated themselves to a somewhat remarkable extent.

Aster Novæ-Angliæ and *Viola cucullata* may always be depended upon to produce colonies in profusion. Besides these, *Viola Canadensis*, originally a handful, has given us in 1899 a mass measuring three feet by two, and has also migrated to the neighboring bed on the other side of the fence. *Viola striata* has grown from one small plant to a fine clump. *Polygonatum biflorum*

SENSITIVE FERN.

has sheltered under its scores of blossoming stems hundreds of its own seedlings in all stages of growth. *Oakesia sessilifolia* has not only spread itself profusely, but bore in 1899 flowers of phenomenal size. *Solidago lanceolata*, whose existence for the first few years seemed rather precarious, formed a bed this year measuring five feet by three feet and ten inches, its increase being due wholly to its own vigor. It was already budding when school closed, June 23d.

The other golden-rods have made great gains also, notably *S. juncea* and *S. latifolia*. *S. sempervirens*, although a seaside species, now forms a clump between five and six feet high, develops an abundance of very large flowers, and is a paradise for wasps, bees, and flies. Like Longfellow's chestnut tree, it "murmurs like a hive" through the month of September.

OSTRICH FERN.

The little Herb Robert has made its lodgment under the edges of stones and the rocky foundation of the fence, and has increased and multiplied as if it were a native of this garden. The Hog Peanut is very prolific and furnishes interesting material for decorative design

Iris versicolor and *Iris Pseudacorus* blossomed profusely this season, the latter bearing five or six flowers on every stalk. Two of the flowers were abnormal, one having four falls and three standards, the other five falls and two standards. In 1898 some of the flowers showed four fully developed falls and standards.

Aspidium acrostichoides, var. *incisum*, was set out in 1894 and has continued for five years to produce beautifully incised fronds, although this variation is said not to be constant.

In his report of the garden for 1896, Mr. Clapp called attention to the fact that many vigorous seedlings had sprung from the

CLAYTON'S FERN AND CINNAMON FERN.

different species of asters originally planted. In the three years since then their number has largely increased, and some interesting variations in color have been noticed. *A. Novæ-Angliæ* and its variety *roseus* have given us a long range of hues from rose to purple. *A. corymbosus* has produced a plant with pink blossoms. *A. acuminatus* has appeared with blue ray flowers.

Many other plants might be mentioned whose naturalization and increase make the garden a veritable bit of the country. In considering our garden we may say it consists not simply of the plants set out eight years ago and in the following years, but of those which have established themselves and which have led us to expect them, season after season, as surely as in their own homes.

Nothing has been said of the beauty and lavish flowering of the roses, cultivated irises, and hardy chrysanthemums, as the School

Garden proper is devoted to the native flora; but the cultivated plants just mentioned were a source of great pleasure while they lasted.

The unusually dry season of 1899 would have affected the garden very unfavorably, had it not been for the efforts of the janitor. By means of a lawn sprinkler he succeeded in keeping the conditions almost normal, and the garden was a most beautiful sight through May and June, while in September and October the asters and golden-rods were in their prime.

We make no provision for flowers which blossom only in July and August as they would be useless to the children, but rely upon those belonging to the spring and fall. We have found by experience that it is better not to make a practice of pulling up all the weeds in the beds, as they screen the earth and prevent too rapid evaporation.

In the spring and fall of 1899, nine classes made use of the garden, sometimes visiting it to observe and sketch the growing plants, and always finding abundant material for nature work in the schoolroom. The blossoming of five species of violets at one time gave an admirable opportunity for comparative work. The liliaceous plants formed another most interesting group. As soon as the crosiers made their appearance, daily visits were made to the fernery by the ninth grade. Each pupil drew a plan of it, locating the different species of ferns, and watching the development of the crosiers with great interest. The asters furnished large numbers of pupils with material for learning the structure of a composite flower, or for comparison with compositæ already studied.

Each child separated the ray flowers from the disk flowers, considered their arrangement, and compared the blossoms and leaves of several species, observing the difference in the size and color of the blossoms, and in the shapes and surfaces of the leaves. He then painted a spray of some aster, together with a single disk flower and a ray flower, afterwards writing a description of the plant.

We look upon the season through which the garden has just passed as the most successful in its history. The first report of it was published in 1891 under the title, "The School Garden Experiment." Having flourished for nine years without any relapse, it may fairly be considered to have passed beyond the

experimental stage, and to have become a permanent part of the equipment of the George Putnam School, especially for the grammar grades, which can make and have made the most extensive use of it.

In the report of 1898 it was said that the space used for a garden, 72×48 feet, is now so crowded with plants, mostly perennials, that additions have been nearly stopped for lack of room. It is proper to add in this connection that a plot of land of equal size in the girls' yard has already begun to be converted into a garden; and another plot of land, half an acre in extent, adjoining these gardens has recently been purchased by the city; and the Superintendent has suggested that this also should be used as a school garden. So it appears that there is room for almost indefinite expansion.

KATHARINE W. HUSTON.

REPORT ON THE MEDFORD SCHOOL GARDENS.

BY GEORGE E. DAVENPORT.

In submitting a report on the Swan and Curtis School Gardens, in Medford, Mass., it seems well to give a brief resumé of their history, and to include the report on the Curtis School Garden by the principal, Miss Amy W. Jones.

DEAR MR. DAVENPORT: I take pleasure in sending you a report of our school garden work the past year. The fall nature work in connection with bulbs proved very satisfactory, and the beautiful blossoms were also much enjoyed in the spring. This fall we have added to the number of cultivated flowering plants. We have continued our practice of adding to the wild flower collections, by bringing in roots whenever we make trips to the woods. Those already in the garden bloomed very nicely, so that we have been able to use a greater variety of specimens and material from the garden in our nature study, than in any preceding year. The children have taken entire care of the garden this year, spading, planting, weeding, etc. We intend to have the garden furnish practical lessons and to be a benefit to the schoolwork, so that the boys and girls will feel that they know how to start gardens for themselves at their homes.

We have had four new beds made for seed planting. We devoted quite a space to vegetables — corn, beans, peas, onions, carrots, potatoes, etc., and watched the results closely. In this the boys were especially interested.

With this report I enclose two photographs, one of which shows some of the largest pupils at work, and the other a fern and wild flower corner.

Respectfully submitted,

AMY WHITMORE JONES.

Curtis School, Medford.

Nov. 16, 1899.

The Swan School Garden was established in April, 1895, with the means furnished by the School Garden Committee of the Horticultural Society, and a subscription fund from citizens of Medford who were favorable to the plan.

Between twenty-five hundred and three thousand feet of land along the inside of the fence line was laid out into beds, spaded, and thoroughly worked over with rich loam and rotted manure to a depth of nearly two feet and made ready for planting.

Arbor Day (April 26) was chosen for the dedication of the garden, and the children were given an outdoor object lesson in the planting of the seed of *Catalpa speciosa*, one of the grandest of our native trees.

Special exercises were prepared and arranged so that every child could participate, and Miriam Davenport Gow, the youngest child in the school at that time, was chosen to plant the seed. After the planting of the seed each child in turn threw over it a handful of earth at the same time reciting an appropriate verse. The exercises were further carried out by the singing of appropriate songs by the children, and a pleasant address by Rev. Henry C. DeLong. The children were greatly pleased with the thought of raising a school tree from the seed, and watched eagerly for the appearance of the young seed tree which came later on.

At this time also two native trees, *Liriodendron Tulipifera*, the Tulip tree, and *Cladrastis tinctoria*, the Virgilia or Yellow-Wood tree, were planted, and in this way the development of the garden began.

CURTIS SCHOOL GARDEN.

Believing it to be wiser, where there are young children to deal with, to begin with a mixed garden, certain portions were set aside exclusively for native plants, and the children were given permission to bring and plant, under the direction of their teachers, such seeds and plants as they chose in the other beds. The result was even more gratifying than was expected for the first season, as the second prize offered by the School Garden Committee was won, besides a special prize for the best collection of flowering plants and the commendation of the Committee. [See Report for 1895.]

Subsequently some unfortunate circumstances prevented a further development of the garden until 1898, when interest in it revived, and the present year has surpassed all previous ones in the character of the work accomplished.

While certain portions are still kept apart for the children to grow nasturtiums, pansies, geraniums, and such other flowers as children love, the proportion of native plants has steadily increased, until at the present time nearly one hundred and fifty species and varieties of wild flowers, native shrubs, and ferns are planted in the garden.

Experience in transplanting in this garden indicates that the fall is the best time to take up and remove most plants as they are less liable to be seriously affected by the disturbance. Some plants that were transplanted under unfavorable conditions have failed to establish themselves thoroughly, and will have to be replaced, but the greater number have succeeded in doing so, and are now fairly well established. The capacity of the garden is so great that for a long time to come it will be difficult, if not impossible, to overstock it. In setting out plants every possible effort has been made to imbed them in as much of their natural soil as can be obtained.

An attractive feature has been the children's rockery, which they have kept in excellent condition. Violets, hepaticas, anemones, blood-root, columbines, corydalis, and some others have bloomed from the crevices in their order of succession, while fine clumps of the shield ferns, spleenworts, Woodsias, and Polypody have added greatly to its charm.

Throughout the season the garden has received the best of care and the children have made frequent use of it for their nature work.

CORNER OF CURTIS SCHOOL GARDEN.

One of the attractions for passers by has been the children out with their teachers making observations and drawings of living plants, and some of these drawings have been considered worthy of selection for sending to the international exhibition.

The Curtis School Garden is the legitimate outgrowth from the nature work which this school was the first in Medford to take up, under the inspiration of the late Miss Laura Davenport. The garden has been under the care of Miss Amy W. Jones, the principal, from the beginning. In 1898 it received the second prize.

School-garden work in Medford is to receive still further re-enforcement another year by the establishment of a garden at the new Brooks Grammar School, at West Medford, under the supervision of Mr. Lewis F. Hobbs, the principal, and at the Washington Grammar Miss Winifred L. Evans has been fortifying her excellent work on ferns by an outside fernery, which the School Garden Committee trusts will lead to an enlargement of garden work on the Washington School Grounds.

The following list records the more important native plants that have been added to the Swan School Garden during the past two seasons:

Acer Pennsylvanicum, L.
" *spicatum*, Lam.
Actæa alba, Bigelow.
" *spicata*, L. var. *rubra* Michx.
Adlumia cirrhosa, Raf.
Amelanchier Canadensis, Torr. & Gray.
Ampelopsis quinquefolia, Mich.
Andromeda polifolia, L.
Asclepias quadrifolia, Jacq.
Aster cordifolius, L.
" *corymbosus*, Ait.
" *dumosus*, L.
" *lævis*, L.
" *macrophyllus*, L.
" *miser*, L.
" *multiflorus*, Ait.
" *patens*, Ait.
" *puniceus*, L.
Aster Tradescanti, L.
" *undulatus*, L.
Azalea Vaseyi.
Baccharis halimifolia, L.
Cassandra calyculata, D.
Ceanothus Americanus, L.
Celastrus scandens, L.
Chelone glabra, L.
Clematis Virginiana, L.
Clintonia borealis, Raf.
Comptonia asplenifolia, Ait.
Coptis trifolia, Salisb.
Cornus florida, L.
Corydalis glauca, Pursh.
Cypripedium acaule, Ait.
Desmodium paniculatum, D. C.
Diervilla trifida, Mœnch.
Diplopappus linariifolius, Hook.
Echium vulgare, L.
Eupatorium sessilifolium, L

Eupatorium teucrifolium, Willd.
Gerardia pedicularis, L.
Goodyera pubescens, R. Br.
Helianthus divaricatus, L.
Hibiscus Moscheutos, L.
Hieracium venosum, L.
Hudsonia tomentosa.
Impatiens pallida, Nutt.
Ledum latifolium, Ait.
Lilium Canadense, L.
" *Philadelphicum*, L.
Liparis liliifolia, Rich.
Lonicera sempervirens, Ait.
Lysimachia radicans, Hook.
Maruta Cotula, D. C.
Menyanthes trifoliata.
Mitchella repens, L.
Myosotis palustris, Withering.
Myrica cerifera, L.
Nemopanthes Canadensis, D. C.
Œnothera biennis, L.
Orchis spectabilis, L.
Polygonatum biflorum, Ele.
" *giganteum*, Dietrich.
Prunus pumila, L.
Quercus Prinus, L. var. *humilis*, Marsh.
Ranunculus fascicularis, Muhl.
Sericocarpus solidagineus, Nees.
Smilacina bifolia, Ker.
" *racemosa*, Desf.
Solidago bicolor, L.
" *cæsia*, L.
" *Canadensis*, L.
" *lanceolata*, L.
" *nemoralis*, Ait.
" *puberula*, Nutt.
Streptopus amplexifolius, D. C.
Thalictrum Cornuti, L.
Trientalis Americana, Pursh.
Uvularia grandiflora, Smith.
" *sessilifolia*, L.
Vaccinium Vitis-Idæa, L.
Verbena hastata, L.
Viburnum acerifolium, L.
" *dentatum*, L.
" *lentago*, L.
Viola canina, L. var. *sylvestris*, Regel.
Viola cucullata, Ait.
" *lanceolata*, L.
" *pubescens*, Ait.
" *sagittata*, Ait.

89 species. Previously recorded 31 species.
Total 120 species,
to which are to be added several native shrubs donated from the Arnold Arboretum.

FERNS.

Phegopteris Dryopteris, Feé.
Ophioglossum vulgatum, L.
Botrychium Virginianum, Swr.

3 species. Previously recorded 27 species.
Total 30 species, including several varieties.

FRAMINGHAM SCHOOL GARDEN.

REPORT ON SCHOOL GARDEN OF FRAMINGHAM STATE NORMAL PRACTICE SCHOOL.

The establishment of a school garden in connection with a state normal school is an event of more than ordinary importance, because teachers are likely to become interested in the growth of plants and then to interest their pupils in the same direction. The teacher may be the source of inspiration in carrying on garden work for many a year and wherever she goes. To start with the teacher is to start in the right place. So the Normal School in Framingham may be called the pioneer in school garden work in New England at least. Concerning the work there something may be learned from the following extracts from an interesting letter written by Miss J. Angelina Smith, of the Framingham State Normal Practice School:

"The garden was started in the spring of 1897 with a few plants which were the survivors of a wild garden kept up by Miss Hyde for years.

This spring it was enlarged and a walk was added, and this fall all the shrubs, except two forsythias, were put in.

The violets furnished material for several drawing lessons in the spring, and this fall the new class has become much interested in ferns, studying them in the garden and in other localities, with the aid of microscopes, both simple and compound.

Last year and this year so far it has been cared for and enlarged by the eighth grade pupils. The boys have shown fully as much interest as the girls and have hunted woods and meadows to see who could get the most beautiful plants.

WILD GARDEN, NORMAL PRACTICE SCHOOL, FRAMINGHAM, MASS.

FILICES.

Osmunda regalis.
" *cinnamomea.*
Onoclea sensibilis.
Aspidium spinulosum.
" *marginale.*
Asplenium ebenoides.
" *Filix-fœmina.*
Adiantum pedatum.
Dicksonia pilosiuscula.

SHRUBS.

Forsythia.
Clematis Virginiana.
Sambucus Canadensis.
" *pubescens.*

Hamamelis Virginiana (Witch-Hazel).
Ilex verticillata.
Viburnum lentago.
Berberis vulgaris.
Rosa rubiginosa.

Common Flowers.

Sanguinaria Canadensis.
Aquilegia Canadensis.
Gentiana Andrewsii.
Smilacina racemosa.
Hepatica triloba.
Anemone nemorosa.
" *thalictroides.*
Viola pedata (white).
" *palmata* var. *cucullata.*
" *sagittata.*
" *blanda.*
" *lanceolata.*
" *Canadensis.*
" *pubescens.*

WENHAM SCHOOL GARDENS.

In the early spring a prize was offered to the five district schools of Wenham for the best school garden which should be started and maintained during the summer.

A commendable effort was made by each school, which has greatly improved the appearances of the school yards and aroused a new interest among the children.

A sketch of the school garden winning the prize may be interesting. Here was a school of twenty-five children, of ages ranging from five to thirteen years, and representing a dozen families, nearly all farmers or laborers.

The school house stands on a little plot of land overgrown with tansy — neglected and desolate in the extreme. It seemed a formidable task for such a school to grapple with a school garden.

Under the guidance of their most enthusiastic teacher, Miss Alta Hill, the children first planned out what they would try to accomplish the first year. The beds and banks were carefully staked, and as fast as the work could be done, each bed was dug out two feet deep — some three — and filled in with good loam. The digging was mainly done by the parents and friends of the school, and the loam, more than thirty two-horse loads, was given by them also.

The children cut the turf and outlined the beds, while the little ones hauled in their carts all the loam for two large beds.

On one side of the school house a fern bed was made. This the children with their teacher did entirely, planting out ten species of our native ferns.

Before the beds were ready for planting, the season was so far advanced that only two clumps of native shrubs, one of sumach and one of barberry, could be planted; the remaining beds were filled in with perennials and seedlings, and the result has been a most attractive school yard all summer.

The devotion shown by the teacher and pupils in keeping alive, during this unusually dry season, all that was set out, has been almost heroic. Each night after school, everything was thoroughly watered, the water being carried in cans from a brook some distance away.

This autumn they plan to add clumps of a half-dozen more native shrubs, and several new ferns. The small beds for study have been made ready for single specimens of the native flowering plants.

The prize money will be expended on garden tools, and cultivated shrubs and perennials.

It has been no small impetus to the children to know they were working with the Horticultural Society, and they are looking forward to competing for the Society prize another year.

A. P. Cole.

SCHOOL GARDEN AT BATH, MAINE.

Bath, Me., Dec. 5, 1899.

Mr. Henry L. Clapp, *Chairman of School Garden Committee:*

Dear Sir: The following plants were added to the Bath High School Garden during the season of 1899:

Adiantum pedatum.	*Erythronium Americanum.*
Amphicarpœa monoica.	*Hypericum Canadense.*
Bidens frondosa.	*Lobelia inflata.*
Brunella vulgaris.	*Rudbeckia hirta.*
Chelone glabra.	*Spiranthes cernua.*
Coptis trifolia.	*Verbena hastata.*
Diervilla trifida.	*Viola Canadensis.*

Some other plants have been set out to replace those which died in the previous season.

Since the garden was begun in 1896 some species have spread to a considerable extent, noticeably *Aspidium Noveboracense* and *Oakesia sessilifolia*.

I hope to increase both the size and usefulness of the garden next year.

With thanks for the generous encouragement given me by your Committee, I am

Very truly yours,

VIOLA G. HOGAN.

AN INTERESTING PAPER.

Dr. F. M. Powell, Superintendent of the Institution for Feeble-minded Children in Glenwood, Iowa, on the 14th of December, 1899, read a very able and suggestive paper on "School Gardens" before the Iowa State Horticultural Society. The paper, fortunately, was put into print and a copy was sent to the Chairman of this Committee, who would gladly quote from it at length, were his own report not so long, but will content himself with quoting a few of the interesting sentences with which the report abounds.

"Through information submitted by a Committee on School Gardens and Children's Herbariums, appointed by the Massachusetts Horticultural Society, I believe this state may justly claim the nearest approach to the ideal school gardens."

"Some one has said 'Kindergartners want the earth.' Yes, that is just what will content us, and the children, too — a small patch of Mother Earth, where each child may have his own little garden bed; where he may raise a few vegetables; where he may handle a rake, a spade, and a hoe; where he may delight, if possible, in a watering-pot and a wheelbarrow; where he may dig and plant; where he may watch and wait and reap. It is not only figuratively, but literally, that kindergartners want the earth."

"One of the most interesting and encouraging letters I have received is from a kindergartner in St. Louis who, with the help of eighty pairs of little hands, transformed an old brick-paved yard, twelve by twenty-four feet, into a real, live, flower garden. This yard had been a playground for many years in the lower part of the city where children came from crowded tenements. The children loosened and removed the bricks, afterwards using them as

boundaries. They made beds, transplanted vines from the kindergarten room, planted seeds, trained vines, and took turns in watering the garden."

"A little boy on being taken to a kindergarten thus expressed his disappointment at what he saw, or, rather, at what he did not see: 'Why, it isn't a garden at all.'"

"Three years ago I directed the florist and gardener to plant flowers in ten feet of space next to the Boys' Cottages. The experiment proved a success in improvement of the grounds, protection to buildings, and object lessons for the boys. The flowers have not been rudely molested in any instance, but tenderly cared for. For the last two years vegetable gardens have been successfully cultivated by the children."

GERMAN SCHOOL GARDENS.

In 1899 the Chairman of the School Garden Committee visited a number of school gardens in Germany and learned from the directors much about the extent, stocking, and management of them and the character of the instruction given in them. Those established in Pössneck and Gera were particularly interesting on account of their size, complete equipment, and usefulness to a large number of children. Each is not far from an acre in area and forms an important factor in the educational system of the city in which it is situated.

Since a large proportion of the pupils in German public schools are destined to till the soil, school authorities there consider that it is quite as important that children should be taught early and thoroughly how to cultivate plants as that they should be taught how to read the masterpieces of literature with the rising and falling inflections in their proper places; consequently, the children know the requirements of plant growth long before they are introduced to Schiller and mythology.

In the Pössneck garden the children have the privilege of choosing what they will plant, vegetables or flowers or both; and most of them choose to raise with their vegetables some lovable plants—those with brilliant blossoms and interesting habits, alpine plants, gentians, harebells, primroses, asters, etc. Out of 533 plant beds made and cultivated by the pupils 350 beds contained both flowers and economic plants, such as aromatic herbs, plants producing oil,

plants having fibres which are used in spinning, grains, medicinal plants, poisonous plants, and various kinds of bulbous and tuberous plants. Each kind forms a separate group. Attention is also given to the native shrubs and the evergreen and deciduous trees of the province.

The pupils of eight grades work in the garden an hour a day—sometime from five to seven o'clock in the afternoon. The notes which they take in the garden serve as a basis for compositions on the various kinds of work connected with farm life. Fertilizing, rotation of crops, the effect of the presence or absence of light, heat, or moisture, the birds and insects injurious or helpful to cetrain kinds of plants, and many other kindred topics are written upon. As a consequence the Germans are expert farmers. A ride on a steam train through any of their farming districts would convince an observer of that fact.

A considerable amount of such work in connection with our public schools, especially in the West, would make young people more contented and successful in farming and keep them from rushing into the cities to become clerks, conductors, and genteel non-producers.

The school garden in Gera, although only three years old, now has 800 species of plants; but the director, Mr. Robert Leube, assured me that in three years more there would be 2400 species in the garden.

A novel feature of this garden is a collection of the geological specimens to be found in East Thuringia. The collection is arranged so as to represent the lay, dip, fault, uplift, etc., of geological strata, and the whole artistically and scientifically conceals the perennial spring of water upon which the success of the garden is so dependent.

As in the Pössneck garden, plants of the same family or economic class are grouped together, the tall and quick growing trees being located in the northern part so that their shadows fall away from the garden. There is a basin for aquatic plants, a rockery for Alpine and rock plants, an extensive fernery, and an abundance of umbrageous shrubs under whose dense foliage wood plants find congenial homes.

To this garden hundreds of children come with their teachers regularly to receive instruction in plant life. They do not work in it with garden tools, as the children do at Pössneck.

In Dresden I had the great pleasure of a visit from Dr. O. W. Beyer, one of the most earnest advocates of school garden work in Germany. About the time in which he was school director in Pössneck, some fifteen years ago, he published a book of two hundred pages called "Naturwissenschaften in der Ertziehungsschule" which treats of all forms of manual training suitable for school children. Apparently all the German school gardens are laid out precisely along the lines marked out by Dr. Beyer in his chapter on school gardens. He did not succeed in establishing the garden during his term of office, the burgomaster of that time being indifferent to the matter; but he sowed the seed that enabled his successor, Dr. Lotz, to found the garden with the aid of the new burgomaster, who favored the enterprise in every way.

The consideration of other school gardens and the mention of other advocates of them must be put aside for another time, on account of the unusual length of this report.

SCHOOL GARDEN PRIZES.

In competing for and determining the prizes offered for the establishment, maintenance, and use of school gardens, I recommend the careful consideration of the following points, mentioned in the order of their relative importance:

1. Adherence to the printed instructions; at least such instructions should be considered of primary importance, and other meritorious points, not mentioned in the instructions, of secondary importance. No rule should be established to bolster up a particular case.

2. It is of the highest importance that the actual use of the garden as an educational means should be illustrated and manifested by pupils' work in drawing, painting, and writing on paper, where cramming and copying can be detected and judged according to its merits if any. The extent to which the pupils' proper work is carried out through the school and the individuality of each pupil's work are important determinants. The genuineness of the work should be evident on the face of the papers; the tracks of the pupils, their excellences and deficiencies should be apparent.

3. Next in importance are snap-shot photographs of pupils sketching, watering, hoeing, digging, comparing, etc. — *not posing*, but really at work in the garden and in unconscious positions.

Time pictures of pupils and teachers in conscious postures, *attitudinizing*, with no evidence of using the garden as a regular source of instruction, should be considered of little value in reference to the real merits of a school garden.

4. Aids to judgment may be furnished by means of photographs of individual specimens or clumps of plants, or of the garden as a whole, to illustrate the abundance, vigor, and blossoming power of plants and their variation under cultivation. So far as such photographs illustrate such points they are helpful; but they do not furnish any evidence that the garden is connected with the school in any vital way.

5. The amount of work done in stocking a garden in a single season is worthy of consideration and should entitle it to a gratuity of some sort proportioned to the amount and quality of the work done; but to award a prize mainly for such work might establish a troublesome precedent. Some enterprising florist might take a notion to stock a garden to advertise his plants. So it is important to consider who does the work and who keeps the garden running.

6. Other things being equal, the garden established and sustained by the teachers and pupils of the school is preferable to that established by an influential or wealthy patron, since the latter, by reason of the uncertainties of wealth and elections, is less likely to be permanent. Interested teachers being on the ground for many years are much more likely to make a close connection between the school and the garden; therefore *reports of what the teachers and pupils really do, written out by themselves* in black and white or illustrated by color *regularly*, are of paramount importance. The garden unrelated to the school has no more educational value than any other private flower or vegetable garden. The garden plus the work of the school with and in it must be considered in determining prizes; and there should be unmistakable evidence that the material for instruction found in the garden has been used regularly, and perhaps it might be added, skillfully, in case of a garden of the highest type and usefulness. Indefinite statements in regard to the enjoyment of the garden, proposed work, etc., are proper enough in the beginning, but they should have no weight in determining prizes.

HENRY L. CLAPP,
Chairman Committee on School Gardens and Children's Herbariums.

CHILDREN'S HERBARIUMS.

Over seventeen hundred herbarium specimens were exhibited in Horticultural Hall, December 1 and 2, 1899. Fortunately this year all the specimens were well displayed, no collections being put under the tables for lack of room, as was the case last year. The tables in both halls were comfortably filled with mounted specimens, which in workmanship were fully equal to any that have been exhibited in previous years.

Vanessa Denton's collection of one hundred and twenty-five specimens was the finest, the arrangement and mounting of the specimens being exceptionally good and the coloring of the flowers being well preserved. Her collection was the best in the exhibition last year. She has exhibited three times.

In previous years George E. Nichols has shown four hundred and fifty-seven specimens and this year he made important additions — seventy-eight flowering plants, thirty-one ferns, ten grasses, and two sedges — having begun to exhibit in 1894, and having exhibited in all five hundred and seventy-eight specimens.

Two Italian boys, William Ghirardini and Charles A. Tosi, from the North End, sent in very good collections. They got their specimens from Franklin Park and vicinity. When they were at the exhibition some one said in their hearing that it was considerable trouble to press plants. One of the Italian boys expressed a contrary opinion, and to show how thoroughly he had mastered the art of pressing plants said, "When I get into the cars with my plants I sit on 'em."

Three brothers, John Murdock, Jr., Richard Murdock, and Joseph Murdock, together sent in over three hundred specimens.

Three members of the French family, Arthur E., Olive L. and Marion L., exhibited two hundred and twenty-seven specimens, all finely mounted. Arthur E. has exhibited five years in succession, and Olive L. three. Marion L., who is only seven years old, exhibited twenty-five flowering plants as her first collection.

Anna M. Christian showed *Aspidium stmulatum* Davenport in her fern collection, this being the first time this fern has been shown by a child at our herbarium exhibition.

At different times the curator of the Fairbanks Museum in St. Johnsbury, Vt , and Mr. Jones, Superintendent of Public Schools,

in the same place, visited the George Putnam School to get information concerning the means of interesting children in elementary science work, school gardens, and herbariums. The reports and prize lists concerning the work done by your Committee were taken away by Mr. Jones who had printed a circular very similar to our prize list, instructions and all; and we are very glad to have such good use made of our material. Excluding "Directions for Competitors," the circular is as follows:

THE FAIRBANKS MUSEUM PRIZES FOR CHILDREN'S HERBARIUMS.

The generosity of friends of the schools has made possible the offer of prizes bearing the above name. The competition is open to pupils enrolled during the year 1898 in grades VI to IX of the schools of the Town of St. Johnsbury. The collections for which prizes are offered are as follows:

	1st. Prize.	2d. Prize.
For 100 species of herbaceous flowering plants,	$5.00	$3.00
" 50 " " " " "	3.00	1.00
" 30 sprays of leaves of trees or shrubs, different species,	3.00	2.00
" 20 sprays of leaves of trees or shrubs, different species,	2.00	1.00
" 25 species of ferns,	4.00	2.00
" 15 " " "	2.00	1.00

It is expected that during the spring term the teachers will assist pupils in starting their herbariums by showing them how to collect, press, mount, and name the plants. With the instruction given pupils should be able to continue the work during the summer vacation. The co-operation of parents in this enterprise is particularly desired by the school management.

The prizes will be awarded at an exhibition of the collections to be held during the month of November, 1899. At this exhibition, collections not entered for prizes may be shown, and specimens not included in the groups of plants mentioned will be welcomed.

PRIZES AND GRATUITIES AWARDED FOR SCHOOL GARDENS AND CHILDREN'S HERBARIUMS.

SCHOOL GARDENS.

George Putnam School, Roxbury, first prize	$15 00
Swan School, Medford, second prize	12 00
Curtis School, Medford, third prize	10 00

CHILDREN'S HERBARIUMS.

FLOWERING PLANTS.— For one hundred and twenty-five specimens:	
First prize, John Murdock, Jr.	$5 00
Second, Helen Robinson	4 00
For one hundred specimens:	
First prize, Robert D. Morss	4 00
Second, Ruth Robinson	3 00
For seventy-five specimens:	
First prize, Philip Morss	3 00
Second, Edith Taft	2 00
For fifty specimens:	
First prize, Charles A. Tosi	2 00
Second, William Ghirardini	1 50
For twenty-five specimens:	
First prize, Marion L. French	1 50
Second, Joseph Murdock	1 00
For ten specimens:	
First prize, Winthrop Swain	75
Second, Richard Murdock	50
Gratuities:	
Vanessa Denton, for one hundred and twenty-five additions	5 00
John Murdock, Jr., for one hundred additions	2 00
Bessie R. Parmenter, for one hundred additions	2 75
Olive L. French, for ninety-two additions	2 75
George E. Nichols, for seventy-eight additions	3 00
Arthur E. French, for seventy-five additions	3 00
Stanley Webb, for seventy-five specimens	1 00
Melora E. Warner, for fifty specimens	2 00
Leonard A. Page, for ten additions	25
FERNS.— For thirty specimens:	
First prize, Genevieve Doran	5 00
Second, George E. Nichols	4 00
For fifteen specimens:	
First prize, John Murdock, Jr.	3 00
For ten specimens:	
First prize, Katherine L. Driscoll	2 00
Second, Anna M. Christian	1 00

For five specimens:		
First prize, George E. Cassidy		75
Second, Richard Murdock		50
Gratuities:		
Melora E. Warner, for fifteen additions		3 00
Theresa Gambetski, for ten specimens		75
SEDGES.— For thirty specimens:		
First prize, Olive L. French		3 00
For twenty specimens:		
Second prize, John Murdock, Jr.		1 00
GRASSES.— For ten specimens:		
First prize, John Murdock, Jr.		1 00
Second, George E. Nichols		50
Total for Gardens and Herbariums		$112 50
The amount of money appropriated by the Society for the use of the Committee was		$250 00
Awarded for School Gardens	$37 00	
Awarded for Herbariums	75 50	
Printing and paper	30 25	
Expressage, stamping, postage	11 75	
Advertising	8 40	
		162 90
Balance unexpended		$87 10

HENRY L. CLAPP, *Chairman*, Roxbury,
GEORGE E. DAVENPORT, Medford,
MISS KATHARINE W. HUSTON, Roxbury,
CHARLES W. JENKS, Bedford,
WILLIAM P. RICH, Chelsea,
MRS. P. D. RICHARDS, West Medford,
MRS. M. L. STEVENS, Cambridge,
W. E. C. RICH, *Secretary*,
99 Moreland Street, Roxbury, Mass.

Committee on School Gardens and Children's Herbariums.

REPORT

OF THE

COMMITTEE ON NATIVE PLANTS.

The exhibition of native plants is always an interesting feature of the Society's work, and has become one of its most important on account of its helpfulness to the cause of education in our public schools. These exhibitions, which have been wisely encouraged by the Society, have been fully appreciated by the large number of visitors who have been attracted by them. Especially valuable and helpful have they been to teachers and others who are interested in nature work in our schools, and great benefit must inevitably accrue to the community as a result.

Not only do they enable those who are botanically inclined to study and compare specimens in a living state, but, extending from early spring until late autumn, they assist in making known to the general public the most attractive portion of our New England Flora. This, in connection with the invaluable collections of Fungi exhibited by the Boston Mycological Club, serves to make Horticultural Hall the Mecca for all who are interested in our native plants.

The enthusiasm of the exhibitors is noticeable, and the untiring industry with which they seek out and arrange for exhibition plants seldom seen is worthy of much higher recognition than it now receives. When to this is added the care taken by them to preserve from destruction the choicer of our native plants, and the sacredness with which they guard the little known localities of rare plants, much praise should be given to them.

Unfortunately, the corps of exhibitors was weakened early in the season by an accident to Mrs. Percival D. Richards, of West Medford, whose exhibits of rare native plants have for some years made her name widely known.

The Committee deplore their inability under present rules to provide for some recognition of an exhibit which fails to receive a prize when of unusual merit, and hope that some way may be found for overcoming this difficulty.

There has been no competition for the prizes for cultivated native plants, and only two entries, perhaps owing to the small amount offered, and the Committee feel that the amount should be increased.

There has, however, been shown almost weekly during the season, but not for competition, a series of exhibits of cultivated native plants from the garden of Robert Manning, aggregating a collection of such a character that the Committee deems it worthy of special and honorable mention.

CULTIVATED NATIVE PLANTS EXHIBITED BY R. MANNING, 1899.

MAY 6.

Lindera Benzoin.
Hepatica triloba.
Viola cucullata.
Viola odorata.
Sanguinaria Canadensis.
Dicentra sp.

MAY 13.

Trillium grandiflorum.
Viola pubescens, var. *scabriuscula.*

MAY 20.

Asimina triloba.
Amelanchier Canadensis.
Cercis Canadensis.

MAY 27.

Podophyllum peltatum.
Arisæma triphyllum.
Smilax herbacea.

JUNE 3.

Polygonatum biflorum.
Dodecatheon Meadia.

JUNE 7.

Arisæma Dracontium.
Viola Canadensis.

JUNE 10.

Anemone Pennsylvanica.

JULY 15.

FERNS.

Onoclea Struthiopteris.
Osmunda cinnamomea.
" *Claytoniana.*
" *regalis.*
Adiantum pedatum.
Asplenium Filix-fœmina.
Aspidium acrostichoides.

JULY 22.

Dioscorea villosa (pistillate).
Campanula rotundifolia.

JULY 29.

Hibiscus Moscheutos.

AUGUST 5.

Lilium superbum.

AUGUST 12.

Liatris pycnostachya.
" *spicata.*
Impatiens fulva.
Clethra alnifolia.

SEPTEMBER 16.

Phytolacca decandra.
Arisæma triphyllum in fruit.
Aster Novæ Angliæ.
" " " var. *roseus.*

SEPTEMBER 28.

Celastrus scandens in fruit.

Some of these, such as *Trillium grandiflorum*, *Podophyllum peltatum*, *Arisæma Dracontium*, *Hibiscus Moscheutos*, *Phytolacca decandra*, and some of the ferns showed much improvement in size and other respects from cultivation.

The character of the exhibitions has been well sustained throughout the season, and the Committee has been glad to welcome two new exhibitors, Miss Edith Noyes and Miss R. L. Mann.

April 22. — Mrs. Percival D. Richards made one of her characteristic exhibitions of early spring flowers, mostly violets, bloodroot, and *Draba verna*, and on the 29th, Miss Alice L. Grinnell exhibited a fine collection of thirty species of spring plants, among them five species of violets and *Claytonia Virginica*. A gratuity was awarded to each.

May 6. Mrs. Richards, Miss Grinnell, and the Misses Eleanor A. and Mollie S. Doran exhibited beautiful collections, containing nearly all of the early May flowers, and received the first, second, and third prizes in the order named.

Miss Grinnell's collection contained nine species and varieties of violets, *Corallorhiza innata*, *Trillium erythrocarpum*, and *Actæa alba*. That of the Misses Doran was of uncommon excellence and deserving of special mention, while that of Mrs. Richards, as usual excelled in the number of the rarer of our early spring flowers.

May 13. A gratuity was awarded to Mrs. P. D. Richards.

May 20. Gratuities were awarded to Mrs. Richards and the Misses Doran.

May 27. A gratuity was awarded to Mrs. Richards.

On June 7 and 8 (postponed dates), prizes for native plants were awarded to Miss Grinnell, Mrs. Richards and the Misses Doran, in the order named.

Among the more interesting plants of this exhibition were:

Lupinus perennis,
Lathyrus maritimus,
Clintonia borealis,
Asarum Canadense,
Hottonia inflata,
Lonicera sempervirens,
Polygala paucifolia,
Sarracenia purpurea,
Kalmia latifolia,
Pogonia verticillata,
Arethusa bulbosa,
Liparis liliifolia,
Asclepias quadrifolia,
Utricularia minor,
Castilleia coccinea,
Aphyllon uniflorum,
and three *Cypripediums*.

June 10. Miss Edith Noyes made her first appearance as an exhibitor with a splendid collection of forty-two species and varieties, receiving a gratuity therefor.

July 1. The Misses Doran exhibited fifty-seven, and Miss Grinnell fifty-four species and varieties, well arranged and showing the early July wild flowers to good advantage. A gratuity was awarded to each.

July 8. Miss Grinnell, Mrs. W. S. Eager, and Miss Noyes, in the order named, were awarded prizes. There were also some fine collections from the Misses Doran and Miss Genevieve Doran that were worthy of special mention.

July 15. Miss Edith Noyes was awarded the first prize for cultivated native plants, Miss Grinnell and Genevieve Doran gratuities for wild flowers, and C. C. Kingman, Miss Grinnell, and the Misses Doran, in the order named, were awarded the prizes for hardy (native) ferns.

July 22. Gratuities were awarded to Edith Noyes, Genevieve Doran, the Misses Doran, and Miss Grinnell for native plants.

July 29. Miss Grinnell, Miss Noyes, and Mrs. Eager were awarded first, second, and third prizes in the order named. There was also a collection from the Misses Doran that was worthy of special menton.

August 5. Miss Grinnell exhibited another of her fine collections for which she was awarded a gratuity.

Sabbatiu chloroides,	*Goodyera repens*,
Coreopsis rosea,	*Cassia Marilandica*, and
Lobelia cardinalis,	*Chimaphila maculata*

were some of the rarer plants of this exhibit.

August 12. Miss Noyes was again awarded the first prize for cultivated native plants, thus entitling her to the Appleton Bronze Medal.

At this exhibition also, the Misses Doran had a splendid collection of uncultivated native plants, containing seven species of golden-rod, four asters, three Eupatoriums, and eleven ferns. Miss R. L. Mann also had an excellent display, and both were awarded gratuities.

August 19. The Misses Doran exhibited an unusually fine collection of ten golden-rods and twenty ferns, Miss Grinnell a splendid collection of midsummer plants, and on the 26th, another collection nearly as fine. Miss Mann also made a praiseworthy exhibit on the 19th. A gratuity was awarded to each.

August 26. A gratuity was awarded to Miss Grinnell.

August 29. The Misses Doran were awarded the first, Miss Grinnell the second, and Miss Mann the third prize for their collections.

Mrs. Eager also exhibited a fine collection, and Walter E. Coburn a superb collection of native grasses. A gratuity was awarded to Mr. Coburn.

Among the novelties of this exhibition was *Lysimachia* (*Steironema*) *radicans* Hooker, credited in the Manual to "West Vir-

ginia and southward," but found by Miss Grinnell quite well established, and shown here by her for the first time.

September 9. A special gratuity was awarded the Misses Doran for a superb collection of native plants in fruit. Gratuities were also awarded Miss Grinnell and Miss Mann, and again to Miss Grinnell and the Misses Doran on the 23d.

November 7. The Misses Doran were awarded a gratuity for a beautiful collection of native ferns, evergreens and plants in fruit.

THE AMOUNT AWARDED IN PRIZES AND GRATUITIES IS AS FOLLOWS:

Mrs. P. D. Richards	$19 00
Miss Alice L. Grinnell	59 00
Misses E. A. and M. S. Doran	37 00
Miss Edith Noyes	19 00
Mrs. W. S. Eager	10 00
Miss R. L. Mann	7 00
Walter E. Coburn	3 00
C. C. Kingman	6 00
Miss Genevieve Doran	2 00
Total	$162 00

AMOUNT OF APPROPRIATIONS FOR NATIVE PLANTS.

5 exhibitions, 3 prizes at each, 8, 6, 4 = 18		$90 00
3 " Cultivated Natives, 3 prizes, 3, 2, 1 = 6		18 00
1 " Hardy Ferns, 3 prizes, 6, 5, 4		15 00
Total amount for prizes		123 00
Appropriation for gratuities		50 00
Total amount		$173 00
Awards. Prizes for Native Plants	$90 00	
" " Cultivated Native Plants	6 00	
" " Hardy Ferns	15 00	
Gratuities	51 00	
Total		162 00
Balance		$11 00

MEDALS AWARDED.

Appleton Silver Medal to Miss Alice L. Grinnell for three first prizes for native plants.

Appleton Bronze Medal to Miss Edith Noyes for two first prizes for cultivated native plants.

The Committee would have liked to award the Society's Silver Medal to Robert Manning for special exhibits of cultivated native plants made by him during the season if the appropriations at its disposal would have warranted its doing so, but finds itself obliged to be content with a special and honorable mention.

Respectfully submitted,

GEORGE E. DAVENPORT,
For the Committee.

PRIZES AND GRATUITIES AWARDED FOR NATIVE PLANTS.

1899.

APRIL 22.

Gratuity:—

Mrs. P. D. Richards	1 00

APRIL 29.

Gratuity:—

Miss Alice L. Grinnell	2 00

MAY 6.

NATIVE PLANTS.—Collection of thirty bottles of named species and varieties, one bottle of each:

First, Mrs. P. D. Richards	8 00
Second, Miss Alice L. Grinnell	6 00
Third, Misses Eleanor A. and Mollie S. Doran	4 00

MAY 13.

Gratuity:—

Mrs. P. D. Richards	2 00

MAY 20.

Gratuities:—

Mrs. P. D. Richards	1 00
Misses Eleanor and Mollie Doran	1 00

MAY 27.

Gratuity:—

Mrs. P. D. Richards	1 00

JUNE 7 AND 8 (*postponed dates*).

NATIVE PLANTS.—Collection of thirty bottles of named species and varieties, one bottle of each:

First, Miss Alice L. Grinnell	8 00
Second, Mrs. P. D. Richards	6 00
Third, Misses Eleanor and Mollie Doran	4 00

JUNE 10.

Gratuity:—

Miss Edith Noyes	2 00

JULY 1.

Gratuities:—

Miss Alice L. Grinnell	2 00
Misses Eleanor and Mollie Doran	2 00

JULY 8.

NATIVE PLANTS.—Collection not exceeding forty bottles of named species and varieties, one bottle of each:

First, Miss Alice L. Grinnell	8 00
Second, Mrs. W. S. Eager	6 00
Third, Miss Edith Noyes	4 00

JULY 15.

HARDY FERNS.—Collection of named species and varieties:

First, C. C. Kingman	6 00
Second, Miss Alice L. Grinnell	5 00
Third, Misses Eleanor and Mollie Doran	4 00

CULTIVATED NATIVE PLANTS.—Collection of species and varieties not common to cultivation:

First, Miss Edith Noyes	3 00

Gratuities:—

Miss Alice L. Grinnell	2 00
Miss Genevieve Doran	1 00

JULY 22.

Gratuities:—

Miss Edith Noyes	1 00
Miss Genevieve Doran	1 00
Miss Alice L. Grinnell	1 00
Misses Eleanor and Mollie Doran	1 00

JULY 29.

NATIVE PLANTS.—Collection, not exceeding forty bottles of named species and varieties, one bottle of each:

First, Miss Alice L. Grinnell	8 00
Second, Miss Edith Noyes	6 00
Third, Mrs. W. S. Eager	4 00

AUGUST 5.

Gratuity:—

Miss Alice L. Grinnell	2 00

AUGUST 12.

CULTIVATED NATIVE PLANTS.—Collection of species and varieties not common to cultivation:

First, Miss Edith Noyes	3 00

Gratuities:—

Misses Eleanor and Mollie Doran	3 00
Miss R. L. Mann	1 00

AUGUST 19.

Gratuities:—

Misses Eleanor and Mollie Doran	3 00
Miss Alice L. Grinnell	3 00
Miss R. L. Mann	1 00

AUGUST 26.

Gratuity:—

Miss Alice L. Grinnell	2 00

AUGUST 30 AND 31.

NATIVE PLANTS.—Collection, not exceeding forty bottles of named species and varieties, one bottle of each:

Misses Eleanor and Mollie Doran	8 00
Miss Alice L. Grinnell	6 00
Miss R. L. Mann	4 00

Gratuity:—

Walter E. Coburn, Special Collection of Native Grasses	3 00

SEPTEMBER 9.

Gratuities:—

Misses Eleanor and Mollie Doran	4 00
Miss Alice L. Grinnell	2 00
Miss R. L. Mann	1 00

SEPTEMBER 23.

Gratuities:—

Miss Alice L. Grinnell	2 00
Misses Eleanor and Mollie Doran	1 00

NOVEMBER 7.

Gratuity:—

Misses Eleanor and Mollie Doran	2 00

APPLETON SILVER MEDAL.

Miss Alice L. Grinnell, she having taken three first prizes for Native Plants.

APPLETON BRONZE MEDAL.

Miss Edith Noyes, she having taken two first prizes for Cultivated Native Plants.

HONORABLE MENTION.

Robert Manning, for a series of exhibits of Cultivated Native Plants.

REPORT

OF THE

Committee on Forestry and Roadside Improvement,

FOR THE YEAR 1899.

By HARVEY N. SHEPARD, CHAIRMAN.

The Committee on Forestry and Roadside Improvement respectfully reports that it has been engaged during the preceding year upon two branches of the work committed to its charge; one, a compilation of the statutes of the Commonwealth relative to trees, which is nearly complete and ready for publication, if the Society shall so authorize; and second, a thorough investigation regarding street or roadside trees in every part of the state, especially what kinds are most frequent; what kinds do best; which, if any, have generally failed; what noteworthy examples of individual trees are on record; whether the value of property abutting on the road has been increased by the planting, or decreased by the felling, of trees along the roadside; whether Arbor Day is observed; whether school children are interested in roadside improvement; in what conditions of soil, moisture, and exposure, trees grow best; what is the effect upon them of electric wires, pipes, lights, and pavements; to what extent roadside trees are placarded with advertisements; from what diseases or pests they suffer; to what extent tree guards are used, and what are the existing by-laws of the town relative to roadside trees.

To obtain this information about four thousand copies of a circular were distributed in the early summer to the Mayors of cities, the Selectmen of towns, the principals of high schools, the members of this Society, the members of the Forestry Association,

the members of the Appalachian Mountain Club, the officers of Agricultural and Horticultural Societies and Farmers' Clubs, and many more to individuals likely to be interested. Replies began to come in almost at once, and though the circular set October first as the time when, if possible, they were all to be in they are still arriving.

Replies have been received from one hundred and twenty-five cities and towns well distributed over the state; and the number, source, and character of these replies is such as to indicate a widespread and strong interest in our roadside trees. Not only has the circular given us much desired information but it has brought us into sympathetic touch with men and women throughout the Commonwealth who are interested in roadside improvement and who anxiously await the help which we should be able to give. This Society can well organize and wisely direct a great share of this now fast-growing interest and enthusiasm. Mr. James Sturgis Pray, the member of our Committee who has undertaken most of the labor in this branch of our work, and to whom the credit for the result is altogether due, has given a good deal of time, not only in the matter of the circular, but in a personal investigation, having made a reconnoissance from Cambridge to Greenfield, down the Connecticut Valley to Long Meadow, thence to Westfield, and both north and south from Pittsfield.

The Committee regrets that it has not so far finished its work as to be able to make a complete report to the Society, but it believes that in the early part of the coming year it will be ready to submit an interesting and useful pamphlet containing a compilation of the statutes, and also a collation from the information already obtained and still coming relative to roadside trees. For this work we respectfully request that an appropriation may be given to us in the sum of three hundred dollars.

For the Committee,

HARVEY N. SHEPARD,
Chairman.

REPORT

OF THE

COMMITTEE OF ARRANGEMENTS,

FOR THE YEAR 1899.

By JOSEPH H. WOODFORD, CHAIRMAN.

The Schedule List of Exhibitions during the past year called for about the same number as in former years, and they all have been very fully attended.

At only two of these shows has any admittance fee been asked, and we are glad to observe the amount received for admissions shows quite an increase over last year. The receipts for the two shows, according to the Treasurer's books will be found at the end of this report.

We are glad to know that the reporters of the daily press have been on the alert all through the season, and that our shows have been so faithfully and fully reported.

The arrangements of the shows have been as varied as possible in the limited space at our command, yet as a general thing they have met the approval of the public and the exhibitors.

We are glad to chronicle the unflagging interest which the gardeners manifest in the exhibitions, not only by contributing to their success but also in profiting by the success of their competitors. Their exhibitions are truly educators to all who take any interest in the growing of anything pertaining to horticulture.

The amount of money placed to the credit of this Committee has nearly all been expended, and for the benefit of the Society. We are now looking with pleasant anticipations to the (we hope) near future when we shall be domiciled in a new and commodious

hall where sufficient space on the ground floor will be provided not only for our exhibitions but for the comfort and convenience of our members and patrons.

The receipts for the Spring Show were . . .	$145 75
The receipts for the Chrysanthemum Show were .	945 50
Total	$1,091 25

All of which is respectfully submitted,

Jos. H. Woodford,
Chairman.

REPORT

TO THE

STATE BOARD OF AGRICULTURE,

FOR THE YEAR 1899.

On March of this year the Massachusetts Horticultural Society had the seventieth anniversary of its organization and found itself in a most flourishing condition.

The Annual Spring Exhibition was held March 21–24, inclusive, at which were shown cinerarias in large quantities, roses, and a very beautiful orchid for the first time on exhibition. There was a specially fine exhibition of carnations, violets, apples, pears, strawberries, and vegetables in the Lower Hall.

On the 8th of May the Society held a fine exhibition of plants, flowers, and vegetables.

June 1 and 2, the Society held a Rhododendron Show, which was a very excellent exhibition, every available space being occupied by these beautiful flowers. In the Lower Hall were exhibited fine specimens of fruits, flowers, and vegetables. This exhibition was exceedingly good considering the dryness of the season.

June 22 and 23 was held the Rose and Strawberry Exhibition. The finest collection of strawberries was one of seventy-five baskets containing from one to three quarts each. Hothouse grapes, cut flowers, and vegetables were also shown.

August 30 and 31 was held the Annual Plant and Flower Show, which, the officers of the Society say, was the best ever made. A large variety of plants, flowers, grapes, and other fruit and vegetables were shown.

September 28 and 29 was held the Annual Fruit and Vegetable Exhibition. Splendid specimens of all kinds of autumn agricultural products filled both halls and in addition, the exhibition of dahlias by itself was well worth seeing. Some of the pumpkins and squashes were extremely large, one of the former weighing seventy-seven pounds.

November 7–10, inclusive, the Society held a Chrysanthemum Exhibition which was larger than usual owing to the exhibition of many new varieties. In the upper hall the potted plants were arranged with great care, and displayed their flowers to the best advantage, and were excellent examples of the gardener's skill.

April 22 the Society held a meeting and authorized a committee to purchase a lot of land on the corner of Massachusetts and Huntington Avenues, comprising 22,500 square feet, and authorized the Finance Committee to sell or improve the Society's real estate on Tremont Street as the Committee shall deem for the best interest of the Society. The President was authorized to appoint a committee of five members, of which he should be chairman, with full powers to erect a building on the corner of Massachusetts and Huntington Avenues, for use of the Society at a cost not exceeding $225,000. A new building is very much needed by the Society where they can have more room and better ventilation for keeping plants than in their present one.

I would suggest that the Society appoint one committee whose duty it shall be to appoint all sub-committees; also that the Society hold fewer Saturday exhibitions, which are not generally patronized except by a few exhibitors, in this manner saving some of their money to make larger premiums at their annual exhibitions. At the present time, with the requirement that all exhibits shall be kept fresh, the exhibitor winning a first prize does not receive enough money to pay for the original exhibition, to say nothing of the expense of keeping it fresh. I think by giving fewer and larger prizes their money would be more widely distributed through the State than it is today.

N. I. Bowditch,

Inspector.

REPORT

OF THE

Committee on Lectures and Publication,

FOR THE YEAR 1899.

The Committee on Lectures and Publication beg leave to submit the following report:

During the lecture season they secured the following course of lectures which they believe will compare favorably with those of any previous season:

January 14. "Ancient and Modern Theories of Disease, with Special Reference to Diseases of Plants caused by Parasitic Fungi," by William T. Sedgwick, Professor of Biology, Massachusetts Institute of Technology, Boston. This lecture was delivered on the John Lewis Russell foundation.

January 21. "Experimental Work in Field and Garden," by Aaron Low, Hingham.

January 28. "Peach Culture," by J. H. Hale, South Glastonbury, Conn.

February 11. "Injurious Insects and their Transformations," by Professor Clarence M. Weed, New Hampshire College Agricultural Experiment Station, Durham, N. H.

February 18. "Why Crops must have Nitrogen and How it can be Provided," by Professor G. C. Caldwell, Cornell University, Ithaca, N. Y. With stereopticon illustrations.

February 25. "The Agriculture of Ancient Times compared with Massachusetts Agriculture," by Hon. William R. Sessions, Secretary of the Massachusetts State Board of Agriculture, Springfield.

March 4. "Questions Answered and Unanswered; the Season of 1898 along Horticultural Lines," by Walter F. Taber, Poughkeepsie, N. Y.

March 11. "Market Gardening," by Herbert W. Collingwood, New York, N. Y.

March 18. "Horticulture in Japan," by John K. M. L. Farquhar, Boston. With stereopticon illustrations.

March 25. "Roadside Treatment; Actual and Possible," by Mrs. F. H. Tucker, Newton.

During the year four parts of the TRANSACTIONS have been published, viz. Parts I and II, 1898; Part I, 1899, and Part III, 1896. The Schedule for the year has also been published, besides several minor publications.

Your Committee would suggest to the chairman of each committee of the Society that it is very desirable that their reports should be made ready as soon as possible after the duties of the current year have ceased, and be handed in to the Secretary in order that the yearly TRANSACTIONS shall be made ready and printed as soon as possible.

All which is respectfully submitted,

AARON LOW,
Chairman.

REPORT

OF THE

COMMITTEE ON THE LIBRARY,

FOR THE YEAR 1899.

As usual the report of this Committee will be brief, for the Librarian includes in his report such items of interest as there may have been in connection with the Library during the year. We have not had the Stickney Fund to draw upon, our enjoyment of the donor's generosity having lapsed by the expiration of the term for which he desired that we should have the use of it.

So well did he calculate that the fund has enabled us to procure nearly all of the really extensive and costly works now existing on the subjects to which this Library is devoted.

We asked for and received an appropriation of one thousand dollars at the beginning of the year, and that sum, one hundred dollars less than we have previously had, proved sufficient. We shall ask for the same amount for the year 1900, but, so complete has the library become, it is probable that the time is not far distant when a smaller sum will suffice.

The various departments of the Library work have made satisfactory progress; the card catalogue of accessions has been kept up and much work has been done on the catalogue of plates. We hope that the beginning of a similar catalogue of subjects may be not very far away.

For the Committee,

W. E. Endicott,

Chairman.

REPORT

OF THE

SECRETARY AND LIBRARIAN,

FOR THE YEAR 1899.

Since a copy has been sent to every member of the Society it seems hardly necessary to say that the first part of the TRANSACTIONS for 1899 was ready, if not as early as if no hindrance had been placed in the way by the failure of one of the lecturers to return his paper, which he had taken home for revision, yet with a reasonable degree of promptness. This paper, I may add, was never returned, and the Committee on Publication were obliged to content themselves with the publication of the abstract printed in the *Transcript* at the time of its delivery. It is to be hoped that no such hindrance will again occur, but it is impossible, when a lecturer desires to take his paper home for revision before final publication, to refuse, and it seems equally impossible to make lecturers sensible of the absolute necessity of a prompt return if the publication of the TRANSACTIONS is not to be delayed, and a chairman of a committee or a lecturer has it just as much in his power as ever to delay publication by negligence in making his report or in returning his paper with revisions.

The two parts preceding that above mentioned, viz, the first and second parts for 1898, have also been published during the year, and also the third part for 1896, being the List of Library Accessions during the year, so that we are in a hopeful way to bring up all arrears. There still remain the third parts for 1897 and 1898, and it was hoped to print the first of these during the present year, but it was ultimately found impossible to do this consistently with justice to other work, but Part III for 1897 is now in an advanced state of preparation. As these third parts form an annual supplement to the Library Catalogue no pains are spared to have them ready at the earliest possible moment, consistent with fulness and accuracy.

During the present and the preceding year the number of Special Meetings for the transaction of important business relating to the Hayes estate, and the purchase of land and the erection of a building for the better accommodation of the Society, has probably been greater than in all the previous history of the Society, and has added materially to the work in the Secretary's department. The number of members added to the Society during the past year has been greater than for many years previous, with the like result of increased work for the Secretary and his assistants.

One of the conditions of the Stickney Fund was that the income of $700 should be expended for *books* in each and every year, but now that the Society's interest in that fund has expired, it was deemed best, in the present crowded state of the Library Room, not to purchase so many books as heretofore, at the same time not neglecting any opportunity to secure a rare and desirable book or to complete a set, or any valuable current publication. The Committee therefore asked for $1,000, $100 less than the total of the income of the Stickney Fund and the Society's appropriation of $400 for periodicals, binding, etc., and it was purposed that the purchase of books be further reduced by employing a larger amount than heretofore in binding such books already in the library as needed it. This purpose has been carried out as far as possible, but owing to the time necessarily given to the TRANSACTIONS it has been impossible to devote as much as we should have liked to give, to the preparation of books for the binder or to the Card Catalogue of Plates.

When the present gallery in the Library Room was built in 1889 the Library Committee was desirous of having it extended around the smaller room, and also to have a stack room on the level of the gallery, built as a half story in the staircase hall. In December, 1893, the subject of extending the gallery around the smaller room was again brought up, and on both these occasions plans and estimates for the necessary alterations in the building and the construction of bookcases for the new gallery and stack room were procured. The present year the President, in his annual address suggested that such alterations might relieve the very congested condition of our books, and asked that the Library Committee give the matter consideration again, which was accordingly done. This was before it was decided whether the Society should

remain in the building and endeavor to adapt it to its enlarged work or erect a new building, and it was felt that if we remained in this building the place above mentioned would be the best and indeed the only way of gaining additional accommodations for the Library. Plans and estimates were therefore more carefully considered than ever before at the expense of much thought and time.

The present year is memorable for the completion of Sargent's "Silva of North America" as originally planned, though a supplementary volume is promised. This is beyond comparison the most magnificent botanical work ever published in this country. Mouillefert's "Arbres et Arbrisseaux" has also been completed. Other noticeable books are "An Old English Garden" by the Countess of Warwick; Haité's "Plant Studies," and Davis's "Ornamental Shrubs," the last supplying more fully than before, information on its subject which has long been wanted. Simon and Cochet's "Names of Roses" is a valuable book of reference. King's Photographs of American Parks form a valuable continuation of his similar collection of English photographs, and is to be followed by more views in this country and also in Europe. The new American edition of Burberry's "Amateur Orchid Cultivator" edited by Dr. J. M. Kitchen is a valuable handbook of that family of plants. Books of the character of "Lamia's Winter Quarters," by Alfred Austin; Mrs. Earle's "Potpourri from a Surrey Garden;" Miss Jekyll's "Wood and Garden," etc., dealing with the literature and amenities of horticulture, more than with practical instructions have been thought desirable as calculated to increase the taste for rural life, and have accordingly been added. Another class of books, which has grown up in the last few years, represented by Maud Going's "Field, Forest, and Wayside Flowers," F. Schuyler Mathews's "Familiar Features of the Roadside," Mrs. Frances Theodora Parson's "How to Know the Ferns," etc., is an attempt to enable persons to become acquainted with the names and affinities of plants, who lack either the time or the disposition to make a systematic study of botany. Judging from the circulation of these books and the reports of those who have read them, the efforts of their authors have met with a considerable degree of success.

ROBERT MANNING,
Secretary and Librarian.

TREASURER'S REPORT.

FOR THE YEAR 1899.

MASSACHUSETTS HORTICULTURAL SOCIETY, *in account current with* CHARLES E. RICHARDSON, *December 30th, 1899.*

DR.

To amount paid on account of Library in 1899:		
Appropriated by the Society	$1,000 00	
Balance of Josiah Stickney Fund	1 00	
		$1,001 00
To amount paid Interest on Funds for Prizes, credited opposite		1,742 72
" " Interest paid on Mortgage . .	3,937 50	
" " " " " Loan . . .	198 90	
		4,136 40
" " paid on Prizes awarded in 1898, viz.:		
" " " Plants	1,727 50	
" " " Flowers	2,042 75	
" " " Fruit	1,666 00	
" " " Vegetables	1,147 00	
" " " Gardens and Greenhouses . .	580 00	
" " " H. H. Hunnewell Prizes for Rhododendrons	105 00	
" " " H. H. Hunnewell Triennial Prizes	160 00	
		$7,428 25
" " " Lot on Massachusetts and Huntington Avenues		225,000 00
" " " Harvard College		12,000 00
" " " H. H. Hunnewell account of old mortgage .		1,000 00
" " " Salaries of Treasurer, Secretary and Assistants		4,300 00
" " " " " Committees		1,218 00
" " " City Taxes		4,466 96
" " " Legal Services		926 25
" " " Incidentals		1,031 03
" " " H. S. Adams		4 00
" " " Committee of Arrangements		395 55
" " " Committee on School Gardens and Children's Herbariums		50 40
Amount carried forward		$264,700 56

Amount brought forward	$264,700 56
To amount paid Insurance	634 32
" " " Repairs	89 67
" " " Exhibition Ware	54 60
" " " Heating	897 24
" " " Lighting	771 69
" " " Water Rates	225 98
" " " Lectures	281 31
" " " Labor	2,345 37
" " " Stationery, Printing, and Postage	2,630 78
" " " on account Real Estate in South Boston	168 99
" " " Committee on Forestry and Roadside Improvement	106 29
" " " on account Building on Massachusetts and Huntington Avenues	5,387 25
	$278,294 05
Balance of Cash December 30, 1899	23,920 27
	$302,214 32

CR.

By Balance of account rendered December 31, 1898			$14,105 60
Received from Building in 1899, viz.:			
Rents of Stores	$17,506 15		
" " Halls	1,315 00		
		$18,821 15	
Received Income from Mt. Auburn Cemetery		5,117 66	
" State Bounty		600 00	
" Admissions and Assessments		4,852 00	
" Annual Exhibitions	$1,091 25		
Less Expenses	331 24		
		760 01	
" Interest on Bonds	6,445 00		
" " " Deposit in Bank	178 74		
		6,623 74	
" Bequest of Francis B. Hayes on account		15,744 24	
" on account on Mortgage		225,000 00	
" from A. P. Loring, Executor		7,500 00	
" " H. H. Hunnewell, Prize Money, 1898		47 00	
" " Sale of Transactions		10 00	
" " Sale of Copies of History		5 00	
" H. E. Woodward in Settlement of Old Debt		835 08	
" Bills Receivable		450 12	
Amounts carried forward		$286,366 00	$14,105 60

Amounts brought forward		$286,366 00	$14,105 60
Received Interest credited the following Funds charged opposite:			
Samuel Appleton Fund .	$50 00		
John A. Lowell " .	50 00		
Theodore Lyman " .	550 00		
Josiah Bradlee " .	50 00		
Benjamin V. French " .	25 00		
W. J. Walker " .	117 72		
Levi Whitcomb " .	25 00		
Benjamin B. Davis " .	25 00		
Marshall P. Wilder " .	50 00		
John Lewis Russell " .	50 00		
H. H. Hunnewell " .	200 00		
Francis Brown Hayes " .	500 00		
Henry A. Gane Memorial Fund,	50 00		
		1,742 72	
			288,108 72
			$302,214 32

(Signed) CHARLES E. RICHARDSON,
Treasurer.

Approved:

H. H. HUNNEWELL,
AUGUSTUS HEMENWAY,
FRANCIS H. APPLETON,
} *Finance Committee.*

ASSETS AND LIABILITIES OF THE MASSACHUSETTS HORTICULTURAL SOCIETY.

DECEMBER 30, 1899.

ASSETS.

Real Estate	$475,000 00	
Stereotype Plates and Copies of History	246 50	
Lake Shore & Michigan So. R. R. Bonds	10,415 25	
City of Newton Bonds	24,228 75	
Chicago, Burlington & Quincy R.R. Bonds	1,000 00	
Atchinson, Topeka & Santa Fé R.R. Bonds	44,693 25	
Chicago, Burlington. & Quincy, Nebraska Extension, R.R. Bonds	50,012 50	
Kansas City, Clinton & Springfield R. R. Bonds	1,980 00	
Sinking Fund	23,872 50	
Furniture and Exhibition Ware	7,729 50	
Library	39,112 47	
Bills Receivable	624 05	
Cash on hand and in Bank	23,920 27	
		$702,835 04

LIABILITIES.

Mortgage			$225,000 00
Prize Funds invested in Building, viz.:			
Samuel Appleton Fund,	$1,000 00		
John A. Lowell "	1,000 00		
Theodore Lyman "	11,000 00		
Josiah Bradlee "	1,000 00		
Benjamin V. French "	500 00		
H. H. Hunnewell "	3,000 00		
W. J. Walker "	2,354 43		
Levi Whitcomb "	500 00		
Benjamin B. Davis "	500 00		
Francis Brown Hayes "	10,000 00		
Henry A. Gane Memorial "	1,000 00		
		$31,854 43	
Amounts carried forward		$31,854 43	$225,000 00

Amounts brought forward		$31,854 43	$225,000 00	
Prize Funds invested in Bonds:				
John Lewis Russell Fund	1,000 00			
Marshall P. Wilder "	1,000 00			
H. H. Hunnewell "	1,000 00			
		3,000 00		
			34,854 43	
Prizes for 1899 payable in 1900			8,349 60	
				$268,204 03
Surplus				434,631 01
				$702,835 04

CHAS. E. RICHARDSON,
Treasurer.

Membership Account of the Massachusetts Horticultural Society, December 30, 1899.

Life Members per last report	535		
Added in 1899	146		
Commuted from Annual	1		
		682	
Deceased		23	
			659
Annual Members per last report	203		
Added in 1899	7		
		210	
Resigned	1		
Commuted to Life	1		
Deceased	5		
Dropped for non-payment for two years	4		
		11	
			199
Present Membership			858

INCOME FROM MEMBERSHIP.

146 new Life Members @ $30	$4,380 00
1 Commuted to Life @ $20	20 00
7 new Annual Members @ $10	70 00
Annual Assessments	382 00
	$4,852 00

CHAS. E. RICHARDSON,
Treasurer.

Dr. *Massachusetts Horticultural Society in account with the Proprietors of Mount Auburn Cemetery.* **Cr.**

For Sales and Improvements within the Cemetery for the year ending December 31, 1899.

To cost of filling up and improving land at Mt. Auburn for the year ending Dec. 31, 1899. The Massachusetts Horticultural Society being charged with their proportion of the same:		
Birch to Eagle and Cherry Avenues	$148 50	
Yew and Fountain Avenues	121 88	
Glen Avenue	500 06	
	$770 44	
One-fourth of $770.44 is	$192 61	
Balance due Mass. Horticultural Society,	5,117 66	
		$5,310 27

By Sales in January	
" " " February	295 00
" " " March	180 00
" " " April	991 00
" " " May	3,758 00
" " " June	1,458 25
" " " July	780 00
" " " August	2,418 00
" " " September	1,440 00
" " " October	4,571 00
" " " November	4,036 85
" " " December	1,440 00
	$21,368 10
Net amount received from Receiving Tomb	1,338 00
	$22,706 10
Less graves repurchased	65 00
	$22,641 10
Deduct for annual expenses	1,400 00
	$21,241 10
Mass. Horticultural Society, ¼ part of $21,241.10	$5,310 27

E. & O. E.

H. B. MACKINTOSH, *Treasurer.*

DECEMBER 31, 1899.

MASSACHUSETTS HORTICULTURAL SOCIETY

To the PROPRIETORS OF THE CEMETERY OF MOUNT AUBURN. *Dr.*

For *one-fourth part* of the following *expenditures for grading* new *lands for sale* during the year 1899:

Birch to Eagle and Cherry Avenues.

66 days, men		$148 50

Yew and Fountain Avenues.

32½ days, man and horse		121 88

Glen Avenue.

38 days, men	$85 50	
64½ days, horses	96 75	
84¾ days, man and horse	317 81	
		500 06
		$770 44
One-fourth of $770.44 is		$192 61

JAMES C. SCORGIE,

Supt. of the Cemetery of Mount Auburn.

MOUNT AUBURN, December 31, 1899.

I certify the foregoing to be a true copy of improvements for the year 1899, rendered by the Superintendent.

H. B. MACKINTOSH,

Treasurer.

Massachusetts Horticultural Society.

OFFICERS AND STANDING COMMITTEES FOR 1900.

President.

FRANCIS H. APPLETON.

Vice-Presidents.

CHARLES H. B. BRECK, OF BRIGHTON. BENJAMIN P. WARE, OF CLIFTON.
WALTER HUNNEWELL, OF WELLESLEY. SAMUEL HARTWELL, OF LINCOLN.

Treasurer and Superintendent of the Building.

CHARLES E. RICHARDSON, OF CAMBRIDGE.

Secretary and Librarian.

ROBERT MANNING, OF SALEM.[1]

Professor of Botany and Vegetable Physiology.

BENJAMIN M. WATSON, OF JAMAICA PLAIN.

Professor of Entomology.

SAMUEL H. SCUDDER, OF CAMBRIDGE.

Delegate to the State Board of Agriculture.

WILLIAM H. SPOONER, OF JAMAICA PLAIN.

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1 Communications to the Secretary, on the business of the Society, should be addressed to him at Horticultural Hall, 101 Tremont street, Boston.

STANDING COMMITTEES.

Executive.

THE PRESIDENT, FRANCIS H. APPLETON, CHAIRMAN.

THE CHAIRMAN OF THE FINANCE COMMITTEE, H. H. HUNNEWELL, *Ex-officio.*

WILLIAM C. STRONG.
WILLIAM H. SPOONER.
NATHANIEL T. KIDDER.
BENJAMIN C. CLARK.
WALTER HUNNEWELL.
CHARLES W. PARKER.
CHARLES F. CURTIS.

Finance.

H. HOLLIS HUNNEWELL, OF BOSTON, CHAIRMAN.

FRANCIS H. APPLETON.
AUGUSTUS HEMENWAY.

Lectures and Publication.

AARON LOW, OF HINGHAM, CHAIRMAN.

JAMES H. BOWDITCH.
E. W. WOOD.

Library.

WILLIAM E. ENDICOTT, OF CANTON, CHAIRMAN.

GEORGE W. HUMPHREY.
WALTER S. PARKER.
GEORGE E. DAVENPORT.
CHARLES W. SWAN.

Plants.

WILLIAM WALLACE LUNT, OF HINGHAM, CHAIRMAN.

JAMES WHEELER.
WILLIAM J. MARTIN.
ARTHUR H. FEWKES.
ROBERT CAMERON.

Flowers.

J. WOODWARD MANNING, OF READING, CHAIRMAN.

MICHAEL H. NORTON.
KENNETH FINLAYSON.
FREDERICK S. DAVIS.
JAMES COMLEY.

Fruits.

E. W. WOOD, OF WEST NEWTON, CHAIRMAN.

CHARLES F. CURTIS.
O. B. HADWEN.
WARREN FENNO.
SAMUEL HARTWELL.
J. WILLARD HILL.
SUMNER COOLIDGE.

Vegetables.

WARREN H. HEUSTIS, OF BELMONT, CHAIRMAN.

CEPHAS H. BRACKETT.
VARNUM FROST.
WALTER RUSSELL.
AARON LOW.
GEORGE D. MOORE.
JOSHUA C. STONE.

Forestry and Roadside Improvement.

HARVEY N. SHEPARD, CHAIRMAN.

NATHANIEL S. SHALER.
J. D. W. FRENCH.
J. WOODWARD MANNING.
JAMES STURGIS PRAY, SECRETARY.

Gardens.

PATRICK NORTON, of Dorchester, Chairman.
CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND ARRANGEMENTS, *Ex-officiis.*
HENRY W. WILSON. JACKSON T. DAWSON.

For Establishing Prizes.

WILLIAM J. STEWART, of Winchester, Chairman.
CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND GARDENS, *Ex-officiis.*
WILLIAM J. MARTIN.

Committee of Arrangements.

JOSEPH H. WOODFORD, of Boston, Chairman.
CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND GARDENS, *Ex-officiis.*
ROBERT FARQUHAR.

MEMBERS FOR LIFE.

Members of the Society and all other persons who may know of deaths, changes in residence, or other circumstances showing that the following list is incorrect in any particular, will confer a favor by promptly communicating to the Secretary any needed corrections.

Information, or any clew to it, is especially desired in regard to members whose names are marked thus.†

Adams, Mrs. Charles Francis, South Lincoln.
Adams, Henry Saxton, Dorchester.
Adams, Luther, Newton.
Alger, Rev. R. F., Becket.
Allen, Hon. Charles H., Lowell.
Allen, Thomas, Boston.
Ames, F. Lothrop, North Easton.
Ames, Mrs. F. L., North Easton.
Ames, George, Boston.
Ames, John S., North Easton.
Ames, Miss Mary S., North Easton.
Ames, Oakes, 2d, North Easton.
Ames, Oliver, North Easton.
Ames, Preston Adams, Boston.
Amory, C. W., Boston.
Amory, Frederick, Boston.
Anderson, Larz, Brookline.
Andrews, Charles L., Milton.
Andrews, Frank W., Washington, D. C.
Andros, Milton, San Francisco, Cal.
Appleton, Francis H., Boston.
Appleton, William S., Boston
Ash, John, Pomfret Centre, Conn.
Asmus, Ernst G., West Hoboken, N. J.
Atkins, Edwin F., Belmont.
Ayer, James B., Boston.
Bailey, Jason S., West Roxbury.
Ball, George H., Boston.
Bancroft, John C., Boston.
Banfield, Francis L., M.D., Worcester.
Barber, J. Wesley, Newton.
Barnard, James M., Boston.
Barnard, Robert M., Everett.
Barnes, Walter S., Somerville.
†Barney, Levi C., Boston.
Barry, John Marshall, Boston.
Barry, William C., Rochester, N. Y.
Bartlett, Edmund, Newburyport.
Bartlett, Francis, Beverly.
Baylies, Walter C., Taunton.
Beal, Leander, Swampscott.
Becker, Frederick C., Cambridge.
Beckford, Daniel R., Jr., Dedham.
Beebe, E. Pierson, Boston.
Beebe, Franklin H., Boston.
Beebe, J. Arthur, Boston.
Bigelow, Albert S., Cohasset.
Bigelow, Joseph S., Cohasset.
Bigelow, Dr. William Sturgis, Boston.
Black, George N., Manchester.
Blake, Miss Anne, Brookline.
Blake, Mrs. Arthur W., Brookline.
Blake, Edward D., Boston.

Blake, Francis, Weston.
Blake, Frederick A., Rochdale.
Blakemore, John E., Roslindale.
Blanchard, John W., West Newton.
Blinn, Richard D., Chicago, Ill.
Bliss, William, Boston.
Boardman, Samuel M., Hyde Park.
Boardman, T. Dennie, Manchester.
Bôcher, Prof. Ferdinand, Cambridge.
Bockus, Charles E., Dorchester.
Bosler, Frank C., Carlisle, Penn.
Bowditch, Charles P., Jamaica Plain.
Bowditch, Ernest W., Milton.
Bowditch, James H., Brookline.
Bowditch, Nathaniel I., Framingham.
Bowditch, William E., Roxbury.
Bowker, William H., Boston.
Brackett, Cephas H., Newton.
Bremer, Mrs. John L., Manchester.
Bresee, Albert, Hubbardton, Vt.
Brewer, Francis W., Hingham.
Briggs, William S., Lincoln.
Brigham, William T., Honolulu, Hawaii.
Brooks, J. Henry, Milton.
Brooks, Lawrence, Groton.
Brooks, Peter C., Boston.
Brooks, Shepherd, Boston.
Brown, Charles E., Yarmouth, N. S.
Brown, Edward J., Weston.
Brown, George Barnard, Brookline.
Brown, John M., Belmont.
Brown, John T., Newburyport.
Brown, Samuel N., Boston.
Bullard, John R., Dedham
Burlen, William H., Boston.
Burnett, Harry, Southborough.
Burnham, John A., Manchester.
Burr, Matthew H., Hingham.
Buswell, Frank E., Brooklyn, N. Y.
Butler, Aaron, Wakefield.
Butler, Edward K., Jamaica Plain.

Cabot, Dr. Arthur T., Boston.
Cabot, Edward C., Brookline.
† Cadness, John, Flushing, N. Y.
Cains, William, South Boston.
Calder, Augustus P., Boston.
Cameron, Robert, Cambridge.
Campbell, Francis, Cambridge.
Capen, John, Boston.
Carlton, Samuel A., Boston.
Carr, Hon. John, Roxbury.
Carter, Charles N., Boston.
Carter, Miss Maria E., Woburn.
Cartwright, George, Dedham.
Casas, W. B. de las, Malden.
Chadbourne, Marshall W., East Watertown.
Chaffin, John C., Newton.
Chamberlain, Chauncy W., Brookline.
Chase, Andrew J., Lynn.
Chase, Daniel E., Somerville.
Chase, George B., Dedham.
Chase, William M., Dorchester.
Cheney, Amos P., Natick.
Cheney, Mrs. Elizabeth S., Wellesley.
Childs, Nathaniel R., Boston.
Choate, Charles F., Southborough.
Christie, William, Newton.
Claflin, Hon. William, Boston.
Clapp, Edward B., Dorchester.
Clapp, James H., Dorchester.
Clapp, William C., Dorchester.
Clark, Benjamin C., Boston.
Clark, B. Preston, Cohasset.
Clark, Miss Eleanor J., Pomfret Centre, Conn.
Clark, J. Warren, Rockville.
Clarke, Miss Cora H., Boston.
Clarke, Eliot C., Boston.
Cleary, Lawrence, Roxbury.
Clough, Micajah Pratt, Lynn.
Cobb, Albert A., Brookline.
Cobb, John C., Milton.
Coburn, Isaac E., Everett.
Codman, James M., Brookline.
Codman, Ogden, South Lincoln.
Collamore, Miss Helen, Boston.
Converse, Elisha S., Malden.

Converse, Col. H. E., Malden.
Coolidge, Joshua, Mount Auburn.
Coolidge, J. Randolph, Chestnut Hill.
Coolidge, Mrs. J. Randolph, Chestnut Hill.
Coolidge, T. Jefferson, Jr., Boston.
Cottle, Henry C., Boston.
Cowing, Walter H., Brookline.
Cox, Thomas A., Dorchester.
Coy, Samuel I., Boston.
Crane, Zenas, Dalton.
Crawford, Dr. Sarah M., Roxbury.
Crocker, Hon. George G., Boston.
Crocker, Miss S. H., Boston.
Crosby, George E., West Medford.
† Crowell, Randall H., Chelsea.
Curtis, Charles F., Jamaica Plain.
Curtis, Charles P., Swampscott.
Curtis, Charles P., Jr., Boston.
Cushing, Livingston, Weston.
Cushing, Robert M., Boston.

† Daggett, Henry C., Boston.
Dalton, Charles H., Beverly.
Daly, John C., Roxbury.
Damon, Frederick W., Arlington.
Dana, Charles B., Wellesley.
Daniels, Dr. Edwin A., Boston.
Davenport, Albert M., East Watertown.
Davenport, Edward, Dorchester.
Davenport, George E., Medford.
Davis, Edward L., Worcester.
Davis, John, Lowell.
Davis, L. Shannon, Brookline.
Dawson, Jackson T., Jamaica Plain.
Dee, Thomas W., Cambridge.
Denny, Clarence H., Boston.
Denton, Eben, Dorchester.
Dewson, Francis A., Newtonville.
Dexter, F. Gordon, Boston.
Dexter, George, Beverly.
Dike, Charles C., Stoneham.
Doliber, Thomas, Brookline.
Donald, William, West Roxbury.
Dorr, George, Dorchester.
Dove, George W. W., Andover.
Dowse, William B. H., West Newton.
Draper, Hon. Eben S., Hopedale.
Draper, George A., Hopedale.
Dreer, William F., Philadelphia, Pa.
Dumaresq, Herbert, Chestnut Hill.
Duncan, James L., Chelsea.
Dunlap, James H., Nashua, N. H.
Durant, William, Boston.
Durfee, George B., Fall River.
Dutcher, Frank J., Hopedale.

Eaton, Horace, Cambridge.
Edgar, William W., Waverly.
Eldredge, H. Fisher, Boston.
† Eldridge, E. H., Roxbury.
Ellicott, Joseph P., Boston.
Elliot, Mrs. John W., Boston.
Elliott, William H., Brighton.
Endicott, William, Boston.
Endicott, William, Jr., Boston.
Endicott, William C., Jr., Danvers.
Endicott, William E., Canton.
Estabrook, Arthur F., Boston.
Ewell, Warren, Dorchester.

Fairchild, Charles, Boston.
Falconer, William, Pittsburgh, Pa.
Farlow, Lewis H., Newton.
Farnsworth, Mrs. William, Dedham.
Farquhar, James F. M., Roslindale.
Farquhar, John K. M. L., Roxbury.
Farquhar, Robert, North Cambridge.
Faxon, John, Quincy.
Fay, H. H., Wood's Holl.
Fay, Joseph S., Jr., Wood's Holl.
Fenno, L. Carteret, Boston.
Fessenden, George B., Allston.
Fewkes, Arthur H., Newton Highlands.
Finlayson, Kenneth, Brookline.
Fisher, James, Roxbury.
Flagg, Augustus, Boston.
Fletcher, George V., Belmont.
Fletcher, J. Henry, Belmont.
Fletcher, John W., Chelsea.

Flint, David B., Boston.
Foster, Charles H. W., Brookline.
Foster, Francis C., Cambridge.
Fottler, John, Jr., Dorchester.
Fowle, George W., Jamaica Plain.
Fowle, William B., Auburndale.
French, Miss Caroline L. W., Boston.
French, J. D. Williams, Boston.
French, Jonathan, Boston.
French, S. Waldo, Jamaica Plain.
French, W. Clifford, Cambridge.
Frohock, Roscoe R., Malden.

Galloupe, Charles W., Swampscott.
Galvin, John, Boston.
Gardner, George A., Boston.
Gardner, George P., Boston.
†Gardner, Henry N., Mount Auburn.
Gardner, John L., Boston.
Gardner, Mrs. John L., Brookline.
Gardner, William Amory, Groton.
Gaston, William A., Boston.
Gibbs, Wolcott, M.D., Newport, R.I.
Gill, George B., Medford.
Gillard, William, Dorchester.
Gilmore, E. W., North Easton.
Gilson, F. Howard, Wellesley Hills.
Glover, Joseph B., Boston.
Goddard, A. Warren, Brookline.
Goddard, Joseph, Sharon.
Goodell, L. W., Dwight.
Gorham, James L., Jamaica Plain.
†Gould, Samuel, Boston.
Gowing, Mrs. Clara E., Kendal Green.
Gray, James, Wellesley.
Gray, Mrs. John C., Boston.
Gregory, Hon. James J. H., Marblehead.
Grew, Edward S., Boston.
Grey, Benjamin, Malden.
Guild, J. Anson, Brookline.

Hadwen, Obadiah B., Worcester.
Hale, James O., Byfield.
Hall, Edwin A., Cambridgeport.
Hall, George A., Chelsea.
Hall, George R., M.D., Warren, R.I.
Hall, Jackson E., Boston.
Hall, Osborn B., Malden.
Hall, William F., Brookline.
Halliday, William H., South Boston.
Hammond, Gardiner G., New London, Conn.
Hammond, George W., Boston.
†Harding, George W., Arlington.
Harding, Louis B., Stamford, Conn.
Hardy, F. D., Cambridgeport.
Harlow, James F., Quincy.
Harris, Charles, Cambridge.
Harris, Thaddeus William, A.M., Keene, N. H.
Hartshorn, Arthur E., Worcester.
Harwood, George Fred, Newton.
Haskell, Edwin B., Auburndale.
Haskell, John C., Lynn.
Hastings, Levi W., Brookline.
Hatch, Mrs. C. S., North Cambridge.
Hatch, Edward, Boston.
Hawken, Mrs. Thomas, Rockland, Me.
Hayward, George P., Roxbury.
†Hazeltine, Hazen, Boston.
Hemenway, Augustus, Canton.
Hemenway, Mrs. Augustus, Canton.
Henshaw, Joseph P. B., Boston.
Henshaw, Samuel, Cambridge.
Hewett, Miss Mary C., Canton.
Hews, Albert H., North Cambridge.
Hilbourn, A. J., Boston.
Hill, John, Stoneham.
Hittinger, Jacob, Mount Auburn.
Hoar, Samuel, Concord.
Hodgkins, John E., Portsmouth, N. H.
Hoitt, Hon. Charles W., Nashua, N. H.
Hollingsworth, Amor L., Milton.
Hollingsworth, Z. T., Boston.
Hollis, George W., Grantville.
Holmes, Edward Jackson, Boston.

Holt, Mrs. Stephen A., Winchester.
Hooper, William, Boston.
Horner, Mrs. Charlotte N.S., Georgetown.
Horsford, Miss Kate, Cambridge.
Hovey, Charles H., South Pasadena, Cal.
Hovey, Stillman S., Woburn.
Howard, Joseph W., Somerville.
Hubbard, Charles Wells, Weston.
Hubbard, James C., Everett.
Humphrey, George W., Dedham.
Hunnewell, Arthur, Wellesley.
Hunnewell, Henry Sargent, Wellesley.
Hunnewell, H. Hollis, Wellesley.
Hunnewell, Walter, Wellesley.
Hunt, Dudley F., Reading.
Hunt, Francis W., Melrose.
†Hunt, Franklin, Boston.
Hunt, William H., Concord.

Jack, John George, Jamaica Plain.
Jackson, Charles L., Cambridge.
Jackson, Robert T., Boston.
James, George Abbot, Nahant.
Janvrin, William S., Revere.
Jeffries, William A. Boston.
Jenks, Charles W., Bedford.
Johnson, J. Frank, Malden.
Jones, Jerome, Brookline.
Jones, Dr. Mary E., Boston.
Jordan, Eben D., Boston.
Jordan, Henry G., Hingham.
Jose, Edwin H., Cambridgeport.

Kakas, Edward, West Medford.
Kellen, William V., Marion.
Kelly, George B., Jamaica Plain.
Kendall, D. S., Woodstock, Ont.
Kendall, Edward, Cambridgeport.
†Kendall, Joseph R., San Francisco, Cal.
Kendall, Dr. Walter G., Atlantic.
Kendrick, Mrs. H. P., Allston.
Kennedy, George G., M.D., Roxbury.
Kent, John, Chestnut Hill.
†Keyes, E. W., Denver, Col.
Keyes, John M., Concord.
Kidder, Charles A., Southborough.
Kidder, Nathaniel T., Milton.
†Kimball, A. P., Boston.
Kimball, David P., Boston.
King, D. Webster, Boston
Kingman, Abner A., Brookline.
Kingman, C. D., Middleborough.
Knapp, Walter H., Newtonville.

Lamb, Horatio A., Milton.
Lancaster, Charles B., Boston.
Lanier, Charles, Lenox.
Lawrence, Amory A., Boston.
Lawrence, Amos A., Boston.
Lawrence, James, Groton.
Lawrence, John, Groton.
Lawrence, Rt. Rev. William, Boston.
Learned, Charles A., Arlington.
Lee, Daniel D., Jamaica Plain.
Lee, Francis H., Salem.
Lee, George C., Newton.
Leeson, Hon. Joseph R., Newton Centre.
Lemme, Frederick, Charlestown.
Leuchars, Robert B., Dorchester.
Lewis, Edwin C., Taunton.
Lewis, William G., Framingham.
Lincoln, George, Hingham.
Lincoln, Col. Solomon, Boston.
Little, James L., Brookline.
Little, John Mason, Swampscott.
Locke, Isaac H., Belmont.
Lockwood, Rhodes, Boston.
Lodge, Richard W., Boston.
Loftus, John P., Dorchester.
Loomis, Elihu G., Bedford.
Loring, Augustus P., Beverly.
Loring, Mrs. William Caleb, Beverly.
Lothrop, William S. H., Boston.
†Lowder, John, Watertown.
Lowell, Abbott Lawrence, Boston.

Lowell, Augustus, Boston.
Luke, Otis H., Brookline.
Lumb, William, Boston.
Lunt, William W., Hingham.
Lyman, George H., Wareham.
Lyman, Mrs. Theodore, Brookline.
Lyon, Henry, M. D., Charlestown.

Mabbett, George, Plymouth.
†Mahoney, John, Boston.
Mallet, E. B., Jr., Freeport, Me.
Mann, James F., Ipswich.
Manning, Jacob W., Reading.
Manning, J. Woodward, Reading.
Manning, Mrs. Lydia B., Reading.
Manning, Robert, Salem.
Manning, Warren H., Brookline.
Marshall, Frederick F., Everett.
Marston, Howard, Boston.
Mason, Miss Ellen F., Boston.
Mason, Col. Frederick, Taunton.
Matthews, Nathan, Boston.
May, Frederick W. G., Boston.
McCarty, Timothy, Providence, R. I.
McWilliam, George, Whitinsville.
Melvin, James C., West Newton.
Merriam, Charles, Boston.
Merriam, Herbert, Weston.
Merrill, Hon. Moody, Roxbury.
Metivier, James, Cambridge.
Milmore, Mrs. Joseph, Washington, D. C.
Minot, Charles S., Milton.
Minton, James, Boston.
Mitton, Edward J., Brookline.
Mixter. George, Boston.
Monteith, David, Dedham
Montgomery, Alexander, Natick.
Moore, John H., Concord.
Morgan, George H., New York, N.Y.
Morse, John T., Jr., Boston.
Moseley, Charles H., Dorchester.
Mudge, George A., Portsmouth, N. H.
Murphy, William Bowen, Boston.
Mutch, John, Brookline.

Nevins, Mrs. David, Methuen.
Newman, John R , Winchester.
Newton, Rev. William W., Pittsfield.
Nickerson, George A., Dedham.
Nickerson, Mrs. George A., Dedham.
Norton, Charles W., Allston.
Norton, Edward E., Boston.

Oakman, Hiram A., North Marshfield.
Olmsted, Frederick Law, Jr., Brookline.
Olmsted, John C., Brookline.
Orpet, Edward O., South Lancaster.

Packer, Charles H., Boston.
Paige, Clifton H., Mattapan.
Parker, Augustus, Roxbury.
Parker, Charles W., Boston.
Parkman, Henry, Boston.
Parsons, John E., Lenox.
Partridge, Horace, North Cambridge.
Patten, Marcellus A., Tewksbury.
Paul, Alfred W., Dighton.
Peabody, Francis H., Boston.
Peabody George A., Danvers.
Peabody, John E., Salem.
Peabody, S. Endicott, Salem.
Peck, O. H., Denver, Col.
Peck, William G., Arlington.
Peirce, Miss Marion W., Topsfield.
+Perry, George W., Malden.
Pfaff, Col. Charles, South Framingham.
Philbrick, William D., Newton Centre.
Phillips, Mrs. John C., North Beverly.
Phillips, William, North Beverly.
Pierce, Dean, Brookline.
Pierce, George Francis, Neponset.
Poor, John R., Brookline.
Pope, Col. Albert A., Cohasset.
Porter, Alexander S., Boston.
Porter, James C., Wollaston.
Potter, Joseph S., Fredericksburg, Va.

Prang, Louis, Roxbury.
Pratt, Laban, Dorchester.
Pratt, Lucius G., West Newton.
Pratt, Robert M., Boston.
Prendergast, J. M., Boston.
Prescott, Eben C., New York, N. Y.
Pringle, Cyrus G., Charlotte, Vt.
Prouty, Gardner, Littleton.
Putnam, George, Manchester
Putnam, Joshua H., Newton Centre.

Quinby, Hosea M., M.D., Worcester.

Raddin, Everett W., North Cambridge.
Rand, Miss Elizabeth L., Newton Highlands.
Rand, Harry S., North Cambridge.
Rand, Oliver J., Cambridgeport.
Rawson, Warren W., Arlington.
Ray, James F., Franklin.
Ray, Hon. Joseph G., Franklin.
Raymond, Walter, Boston.
Read, Charles A., Manchester.
Reardon, John B., Boston.
Reed, Henry R., Jamaica Plain.
Rice, George C., Worcester.
Richards, John J., Boston.
Richardson, Charles E., Cambridge.
Rinn, J. Ph., Boston.
Ripley, Charles, Dorchester.
Ripley, Ebed L., Hingham Centre.
Robbins, I. Gilbert, Melrose Highlands.
Robinson, John, Salem.
Robinson, Joseph B., Dorchester.
Robinson, Warren J., Somerville.
Rogers, Mrs. Jacob C., Peabody.
Roy, David Frank, Malden.
Ruddick, William H., M.D., South Boston.
Russell, George, Woburn.
Russell, Hon. John E., Leicester.
Russell, Walter, Arlington.

Salisbury, William C. G., Brookline.
Saltonstall, Richard M., Newton.
Sanford, Oliver S., Hyde Park.
Sanger, Mrs. George P., Boston.
Sargent, Charles S., Brookline.
Sargent, Mrs. Charles S., Brookline.
Sargent, Mrs. Francis W., Wellesley
Sawtelle, Eli A., Boston.
Sawyer, Timothy T., Boston.
Schlesinger, Barthold, Brookline.
Scorgie, James C., Cambridge.
†Scott, Charles, Newton.
Sears, Miss Clara E., Boston.
Sears, Miss Emily E., Boston.
Sears, Dr. Henry F., Boston.
Sears, J. Montgomery, Boston.
Sears, Mrs. J. Montgomery, Boston.
Shaler, Nathaniel S., Cambridge.
Shaw, Christopher C., Milford, N.H.
Shaw, Francis, Wayland.
Shaw, Mrs. Robert G., Wellesley.
Sherman, William H., Boston.
Shorey, John L., Lynn.
Shuman, Hon. A., Roxbury.
Sias, Charles D., Wenham.
Siebrecht, H. A., New Rochelle, N.Y.
Simpkins, Miss Mabel, Yarmouth.
Skinner, Francis, Boston.
Skinner, Francis, Jr., Boston.
Sleeper, Henry Davis, Boston.
Smith, Calvin W., Wellesley Hills.
Smith, Charles H., Newton Highlands.
Smith, Charles S., Lincoln.
Smith, Edward N., San Francisco, Cal.
Smith, George O., Boston.
Smith, Thomas Page, Waltham.
Snow, Eugene A., Melrose.
Snow, Samuel T., Cohasset.
Sohier, Col. William D., Beverly.
Souther, Charles H., Jamaica Plain.
Spaulding, Edward, West Newton.
Speare, Alden, Newton Centre.
Spooner, William H., Jamaica Plain.
Sprague, Hon. Charles F., Brookline.

Sprague, Isaac, Wellesley Hills.
Springall, George, Malden.
Stearns, Frank W., Newton.
Stedman, Henry R., M.D., Roslindale.
Stevens, Hon. Moses T., Andover.
Stewart, William J., Winchester.
Stone, Charles W., Boston.
Stone, Prof. George E., Amherst.
Stone, George F., Chestnut Hill.
Strater, Herman, Roxbury.
Strong, William C., Waban.
Swain, Charles E., Roxbury.
Sweet, Everell F., Malden.

Talbot, Mrs. I. Tisdale, Boston.
Tarbell, George G , M.D., Boston.
Taylor, Charles H., Boston.
Taylor, Horace B., Portland, Me.
Temple, Felker L., Boston.
Tenney, C. H., Methuen.
Thayer, Mrs. Alice R., Boston.
Thayer, Eugene V. R., South Lancaster.
Thayer, Mrs. Eugene V. R., South Lancaster.
Thayer, John E., South Lancaster.
Thayer, Mrs. John E., South Lancaster.
Thayer, Nathaniel, Lancaster.
Thayer, Mrs. Nathaniel, Lancaster.
Thayer, S. V. R., Boston.
Thiemann, Hermann, Manchester.
Thomas, W. B., Manchester.
Thurlow, Thomas C., West Newbury.
Tilton, Stephen W., Roxbury.
Todd, John, Hingham.
Tolman, Benjamin, Concord.
Toppan, Roland W., Malden.
Torrey, Everett, Charlestown.
Tower, Miss Ellen May, Lexington.
Trepess, Samuel J., Glencove, L. I., N. Y.
†Turner, John M., Dorchester.
Turner, Roswell W., Boston.

Vander-Woerd, Charles, Waltham.
Vaughan, William Warren, Boston.
Vinal, Miss Mary L., Somerville.

Wakefield, E. H., Cambridge.
Walcott, Henry P., M.D., Cambridge.
Waldo, C. Sidney, Jamaica Plain.
Wales, George O., Braintree.
Walker, Miss Mary Sophia, Waltham.
Walley, Mrs. W. P., Boston.
Walsh, Michael H., Wood's Holl.
Walton, Daniel G., Wakefield.
Ward, Francis Jackson, Roxbury.
Ward, John, Newton Centre.
Ware, Benjamin P., Clifton.
Ware, Miss Mary L., Boston.
Warren, Samuel D., Dedham.
Washburn, Andrew, Hyde Park.
Watson, Benjamin M., Jamaica Plain.
Watson, Thomas A., East Braintree.
Watts, Isaac, Waverly.
Webber, Aaron D., Boston.
Webster, Hollis, Cambridge.
Weld, Christopher Minot, Jamaica Plain.
Weld, George W., Boston.
Weld, Richard H., Boston.
Weld, Gen. Stephen M., Dedham.
West, Mrs. Maria L., Neponset.
Weston, Seth, Chelsea.
Wheeler, Frank, Concord.
Wheeler, James, Brookline.
Wheeler, Wilfred, Concord.
Wheelwright, A. C., Brookline.
Wheelwright, Edmund M., Boston.
Whitcomb, William B., Medford.
White, Francis A., Brookline.
White, George R., Boston.
White, Joseph H., Brookline.
Whitney, Arthur E., Winchester.
Whitney, Ellerton P., Milton.
Whitney, Henry M., Cohasset.
Whittier, George E., Groton.

Whittier, William Benjamin, South Framingham.
Wigglesworth, George, Milton.
Wilbur, George B., West Newton.
Wilder, Edward Baker, Dorchester.
Wilder, Henry A., Malden.
Willard, E. W., Newport, R. I.
Willcutt, Levi L., Brookline.
Williams, Miss Adelia Coffin, Roxbury.
Williams, Benjamin B., Boston.
Williams, John Davis, Boston.
Williams, Philander, Taunton.
Willis, George W., Chelsea.
Willis, Joshua C., Roxbury.
Wilson, Col. Henry W., Boston.
Wilson, William Power, Boston.
Winthrop, Robert C., Jr., Boston.
Wolcott, Hon. Roger, Milton.
Wood, Edmund M., Natick.
Wood, William K., West Newton.
Woods, Henry, Boston.
Wright, George C., West Acton.
Wright, John G., Brookline.
Wyman, Oliver B., Shrewsbury.
Wyman, Windsor H., North Abington.

Sprague, Isaac, Wellesley Hills.
Springall, George, Malden.
Stearns, Frank W., Newton.
Stedman, Henry R., M.D., Roslindale.
Stevens, Hon. Moses T., Andover.
Stewart, William J., Winchester.
Stone, Charles W., Boston.
Stone, Prof. George E., Amherst.
Stone, George F., Chestnut Hill.
Strater, Herman, Roxbury.
Strong, William C., Waban.
Swain, Charles E., Roxbury.
Sweet, Everell F., Malden.

Talbot, Mrs. I. Tisdale, Boston.
Tarbell, George G , M.D., Boston.
Taylor, Charles H., Boston.
Taylor, Horace B., Portland, Me.
Temple, Felker L., Boston.
Tenney, C. H., Methuen.
Thayer, Mrs. Alice R., Boston.
Thayer, Eugene V. R., South Lancaster.
Thayer, Mrs. Eugene V. R., South Lancaster.
Thayer, John E., South Lancaster.
Thayer, Mrs. John E., South Lancaster.
Thayer, Nathaniel, Lancaster.
Thayer, Mrs. Nathaniel, Lancaster.
Thayer, S. V. R., Boston.
Thiemann, Hermann, Manchester.
Thomas, W. B., Manchester.
Thurlow, Thomas C., West Newbury.
Tilton, Stephen W., Roxbury.
Todd, John, Hingham.
Tolman, Benjamin, Concord.
Toppan, Roland W., Malden.
Torrey, Everett, Charlestown.
Tower, Miss Ellen May, Lexington.
Trepess, Samuel J., Glencove, L. I., N. Y.
†Turner, John M., Dorchester.
Turner, Roswell W., Boston.

Vander-Woerd, Charles, Waltham.
Vaughan, William Warren, Boston.
Vinal, Miss Mary L., Somerville.

Wakefield, E. H., Cambridge.
Walcott, Henry P., M.D., Cambridge.
Waldo, C. Sidney, Jamaica Plain.
Wales, George O., Braintree.
Walker, Miss Mary Sophia, Waltham.
Walley, Mrs. W. P., Boston.
Walsh, Michael H., Wood's Holl.
Walton, Daniel G., Wakefield.
Ward, Francis Jackson, Roxbury.
Ward, John, Newton Centre.
Ware, Benjamin P., Clifton.
Ware, Miss Mary L., Boston.
Warren, Samuel D., Dedham.
Washburn, Andrew, Hyde Park.
Watson, Benjamin M., Jamaica Plain.
Watson, Thomas A., East Braintree.
Watts, Isaac, Waverly.
Webber, Aaron D., Boston.
Webster, Hollis, Cambridge.
Weld, Christopher Minot, Jamaica Plain.
Weld, George W., Boston.
Weld, Richard H., Boston.
Weld, Gen. Stephen M., Dedham.
West, Mrs. Maria L., Neponset.
Weston, Seth, Chelsea.
Wheeler, Frank, Concord.
Wheeler, James, Brookline.
Wheeler, Wilfred, Concord.
Wheelwright, A. C., Brookline.
Wheelwright, Edmund M., Boston.
Whitcomb, William B., Medford.
White, Francis A., Brookline.
White, George R., Boston.
White, Joseph H., Brookline.
Whitney, Arthur E., Winchester.
Whitney, Ellerton P., Milton.
Whitney, Henry M., Cohasset.
Whittier, George E., Groton.

Whittier, William Benjamin, South Framingham.
Wigglesworth, George, Milton.
Wilbur, George B., West Newton.
Wilder, Edward Baker, Dorchester.
Wilder, Henry A., Malden.
Willard, E. W., Newport, R. I.
Willcutt, Levi L., Brookline.
Williams, Miss Adelia Coffin, Roxbury.
Williams, Benjamin B., Boston.
Williams, John Davis, Boston.
Williams, Philander, Taunton.
Willis, George W., Chelsea.
Willis, Joshua C., Roxbury.
Wilson, Col. Henry W., Boston.
Wilson, William Power, Boston.
Winthrop, Robert C., Jr., Boston.
Wolcott, Hon. Roger, Milton.
Wood, Edmund M., Natick.
Wood, William K., West Newton.
Woods, Henry, Boston.
Wright, George C., West Acton.
Wright, John G., Brookline.
Wyman, Oliver B., Shrewsbury.
Wyman, Windsor H., North Abington.

Flint, David B., Boston.
Foster, Charles H. W., Brookline.
Foster, Francis C., Cambridge.
Fottler, John, Jr., Dorchester.
Fowle, George W., Jamaica Plain.
Fowle, William B., Auburndale.
French, Miss Caroline L. W., Boston.
French, J. D. Williams, Boston.
French, Jonathan, Boston.
French, S. Waldo, Jamaica Plain.
French, W. Clifford, Cambridge.
Frohock, Roscoe R., Malden.

Galloupe, Charles W., Swampscott.
Galvin, John, Boston.
Gardner, George A., Boston.
Gardner, George P., Boston.
†Gardner, Henry N., Mount Auburn.
Gardner, John L., Boston.
Gardner, Mrs. John L., Brookline.
Gardner, William Amory, Groton.
Gaston, William A., Boston.
Gibbs, Wolcott, M.D., Newport, R.I.
Gill, George B., Medford.
Gillard, William, Dorchester.
Gilmore, E. W., North Easton.
Gilson, F. Howard, Wellesley Hills.
Glover, Joseph B., Boston.
Goddard, A. Warren, Brookline.
Goddard, Joseph, Sharon.
Goodell, L. W., Dwight.
Gorham, James L., Jamaica Plain.
†Gould, Samuel, Boston.
Gowing, Mrs. Clara E., Kendal Green.
Gray, James, Wellesley.
Gray, Mrs. John C., Boston.
Gregory, Hon. James J. H., Marblehead.
Grew, Edward S., Boston.
Grey, Benjamin, Malden.
Guild, J. Anson, Brookline.

Hadwen, Obadiah B., Worcester.
Hale, James O., Byfield.
Hall, Edwin A., Cambridgeport.
Hall, George A., Chelsea.
Hall, George R., M.D., Warren, R.I.
Hall, Jackson E., Boston.
Hall, Osborn B., Malden.
Hall, William F., Brookline.
Halliday, William H., South Boston.
Hammond, Gardiner G., New London, Conn.
Hammond, George W., Boston.
†Harding, George W., Arlington.
Harding, Louis B., Stamford, Conn.
Hardy, F. D., Cambridgeport.
Harlow, James F., Quincy.
Harris, Charles, Cambridge.
Harris, Thaddeus William, A.M., Keene, N. H.
Hartshorn, Arthur E., Worcester.
Harwood, George Fred, Newton.
Haskell, Edwin B., Auburndale.
Haskell, John C., Lynn.
Hastings, Levi W., Brookline.
Hatch, Mrs. C. S., North Cambridge.
Hatch, Edward, Boston.
Hawken, Mrs. Thomas, Rockland, Me.
Hayward, George P., Roxbury.
†Hazeltine, Hazen, Boston.
Hemenway, Augustus, Canton.
Hemenway, Mrs. Augustus, Canton.
Henshaw, Joseph P. B., Boston.
Henshaw, Samuel, Cambridge.
Hewett, Miss Mary C., Canton.
Hews, Albert H., North Cambridge.
Hilbourn, A. J., Boston.
Hill, John, Stoneham.
Hittinger, Jacob, Mount Auburn.
Hoar, Samuel, Concord.
Hodgkins, John E., Portsmouth, N. H.
Hoitt, Hon. Charles W., Nashua, N. H.
Hollingsworth, Amor L., Milton.
Hollingsworth, Z. T., Boston.
Hollis, George W., Grantville.
Holmes, Edward Jackson, Boston.

Holt, Mrs. Stephen A., Winchester.
Hooper, William, Boston.
Horner, Mrs. Charlotte N.S., Georgetown.
Horsford, Miss Kate, Cambridge.
Hovey, Charles H., South Pasadena, Cal.
Hovey, Stillman S., Woburn.
Howard, Joseph W., Somerville.
Hubbard, Charles Wells, Weston.
Hubbard, James C., Everett.
Humphrey, George W., Dedham.
Hunnewell, Arthur, Wellesley.
Hunnewell, Henry Sargent, Wellesley.
Hunnewell, H. Hollis, Wellesley.
Hunnewell, Walter, Wellesley.
Hunt, Dudley F., Reading.
Hunt, Francis W., Melrose.
†Hunt, Franklin, Boston.
Hunt, William H., Concord.

Jack, John George, Jamaica Plain.
Jackson, Charles L., Cambridge.
Jackson, Robert T., Boston.
James, George Abbot, Nahant.
Janvrin, William S., Revere.
Jeffries, William A. Boston.
Jenks, Charles W., Bedford.
Johnson, J. Frank, Malden.
Jones, Jerome, Brookline.
Jones, Dr. Mary E., Boston.
Jordan, Eben D., Boston.
Jordan, Henry G., Hingham.
Jose, Edwin H., Cambridgeport.

Kakas, Edward, West Medford.
Kellen, William V., Marion.
Kelly, George B., Jamaica Plain.
Kendall, D. S., Woodstock, Ont.
Kendall, Edward, Cambridgeport.
†Kendall, Joseph R., San Francisco, Cal.
Kendall, Dr. Walter G., Atlantic.
Kendrick, Mrs. H. P., Allston.
Kennedy, George G., M.D., Roxbury.
Kent, John, Chestnut Hill.
†Keyes, E. W., Denver, Col.
Keyes, John M., Concord.
Kidder, Charles A., Southborough.
Kidder, Nathaniel T., Milton.
†Kimball, A. P., Boston.
Kimball, David P., Boston.
King, D. Webster, Boston
Kingman, Abner A., Brookline.
Kingman, C. D., Middleborough.
Knapp, Walter H., Newtonville.

Lamb, Horatio A., Milton.
Lancaster, Charles B., Boston.
Lanier, Charles, Lenox.
Lawrence, Amory A., Boston.
Lawrence, Amos A., Boston.
Lawrence, James, Groton.
Lawrence, John, Groton.
Lawrence, Rt. Rev. William, Boston.
Learned, Charles A., Arlington.
Lee, Daniel D., Jamaica Plain.
Lee, Francis H., Salem.
Lee, George C., Newton.
Leeson, Hon. Joseph R., Newton Centre.
Lemme, Frederick, Charlestown.
Leuchars, Robert B., Dorchester.
Lewis, Edwin C., Taunton.
Lewis, William G., Framingham.
Lincoln, George, Hingham.
Lincoln, Col. Solomon, Boston.
Little, James L., Brookline.
Little, John Mason, Swampscott.
Locke, Isaac H., Belmont.
Lockwood, Rhodes, Boston.
Lodge, Richard W., Boston.
Loftus, John P., Dorchester.
Loomis, Elihu G., Bedford.
Loring, Augustus P., Beverly.
Loring, Mrs. William Caleb, Beverly.
Lothrop, William S. H., Boston.
†Lowder, John, Watertown.
Lowell, Abbott Lawrence, Boston.

Lowell, Augustus, Boston.
Luke, Otis H., Brookline.
Lumb, William, Boston.
Lunt, William W., Hingham.
Lyman, George H., Wareham.
Lyman, Mrs. Theodore, Brookline.
Lyon, Henry, M. D., Charlestown.

Mabbett, George, Plymouth.
†Maboney, John, Boston.
Mallet, E. B., Jr., Freeport, Me.
Mann, James F., Ipswich.
Manning, Jacob W., Reading.
Manning, J. Woodward, Reading.
Manning, Mrs. Lydia B., Reading.
Manning, Robert, Salem.
Manning, Warren H., Brookline.
Marshall, Frederick F., Everett.
Marston, Howard, Boston.
Mason, Miss Ellen F., Boston.
Mason, Col. Frederick, Taunton.
Matthews, Nathan, Boston.
May, Frederick W. G., Boston.
McCarty, Timothy, Providence, R. I.
McWilliam, George, Whitinsville.
Melvin, James C., West Newton.
Merriam, Charles, Boston.
Merriam, Herbert, Weston.
Merrill, Hon. Moody, Roxbury.
Metivier, James, Cambridge.
Milmore, Mrs. Joseph, Washington, D. C.
Minot, Charles S., Milton.
Minton, James, Boston.
Mitton, Edward J., Brookline.
Mixter. George, Boston.
Monteith, David, Dedham
Montgomery, Alexander, Natick.
Moore, John H., Concord.
Morgan, George H., New York, N.Y.
Morse, John T., Jr., Boston.
Moseley, Charles H., Dorchester.
Mudge, George A., Portsmouth, N. H.
Murphy, William Bowen, Boston.
Mutch, John, Brookline.

Nevins, Mrs. David, Methuen.
Newman, John R , Winchester.
Newton, Rev. William W., Pittsfield.
Nickerson, George A., Dedham.
Nickerson, Mrs. George A., Dedham.
Norton, Charles W., Allston.
Norton, Edward E., Boston.

Oakman, Hiram A., North Marshfield.
Olmsted, Frederick Law, Jr., Brookline.
Olmsted, John C., Brookline.
Orpet, Edward O., South Lancaster.

Packer, Charles H., Boston.
Paige, Clifton H., Mattapan.
Parker, Augustus, Roxbury.
Parker, Charles W., Boston.
Parkman, Henry, Boston.
Parsons, John E., Lenox.
Partridge, Horace, North Cambridge.
Patten, Marcellus A., Tewksbury.
Paul, Alfred W., Dighton.
Peabody, Francis H., Boston.
Peabody George A., Danvers.
Peabody, John E., Salem.
Peabody, S. Endicott, Salem.
Peck, O. H., Denver, Col.
Peck, William G., Arlington.
Peirce, Miss Marion W., Topsfield.
+Perry, George W., Malden.
Pfaff, Col. Charles, South Framingham.
Philbrick, William D., Newton Centre.
Phillips, Mrs. John C., North Beverly.
Phillips, William, North Beverly.
Pierce, Dean, Brookline.
Pierce, George Francis, Neponset.
Poor, John R., Brookline.
Pope, Col. Albert A., Cohasset.
Porter, Alexander S., Boston.
Porter, James C., Wollaston.
Potter, Joseph S., Fredericksburg, Va.

Prang, Louis, Roxbury.
Pratt, Laban, Dorchester.
Pratt, Lucius G., West Newton.
Pratt, Robert M., Boston.
Prendergast, J. M., Boston.
Prescott, Eben C., New York, N. Y.
Pringle, Cyrus G., Charlotte, Vt.
Prouty, Gardner, Littleton.
Putnam, George, Manchester
Putnam, Joshua H., Newton Centre.

Quinby, Hosea M., M.D., Worcester.

Raddin, Everett W., North Cambridge.
Rand, Miss Elizabeth L., Newton Highlands.
Rand, Harry S., North Cambridge.
Rand, Oliver J., Cambridgeport.
Rawson, Warren W., Arlington.
Ray, James F., Franklin.
Ray, Hon. Joseph G., Franklin.
Raymond, Walter, Boston.
Read, Charles A., Manchester.
Reardon, John B., Boston.
Reed, Henry R., Jamaica Plain.
Rice, George C., Worcester.
Richards, John J., Boston.
Richardson, Charles E., Cambridge.
Rinn, J. Ph., Boston.
Ripley, Charles, Dorchester.
Ripley, Ebed L., Hingham Centre.
Robbins, I. Gilbert, Melrose Highlands.
Robinson, John, Salem.
Robinson, Joseph B., Dorchester.
Robinson, Warren J., Somerville.
Rogers, Mrs. Jacob C., Peabody.
Roy, David Frank, Malden.
Ruddick, William H., M.D., South Boston.
Russell, George, Woburn.
Russell, Hon. John E., Leicester.
Russell, Walter, Arlington.

Salisbury, William C. G., Brookline.
Saltonstall, Richard M., Newton.
Sanford, Oliver S., Hyde Park.
Sanger, Mrs. George P., Boston.
Sargent, Charles S., Brookline.
Sargent, Mrs. Charles S., Brookline.
Sargent, Mrs. Francis W., Wellesley
Sawtelle, Eli A., Boston.
Sawyer, Timothy T., Boston.
Schlesinger, Barthold, Brookline.
Scorgie, James C., Cambridge.
†Scott, Charles, Newton.
Sears, Miss Clara E., Boston.
Sears, Miss Emily E., Boston.
Sears, Dr. Henry F., Boston.
Sears, J. Montgomery, Boston.
Sears, Mrs. J. Montgomery, Boston.
Shaler, Nathaniel S., Cambridge.
Shaw, Christopher C., Milford, N.H.
Shaw, Francis, Wayland.
Shaw, Mrs. Robert G., Wellesley.
Sherman, William H., Boston.
Shorey, John L., Lynn.
Shuman, Hon. A., Roxbury.
Sias, Charles D., Wenham.
Siebrecht, H. A., New Rochelle, N.Y.
Simpkins, Miss Mabel, Yarmouth.
Skinner, Francis, Boston.
Skinner, Francis, Jr., Boston.
Sleeper, Henry Davis, Boston.
Smith, Calvin W., Wellesley Hills.
Smith, Charles H., Newton Highlands.
Smith, Charles S., Lincoln.
Smith, Edward N., San Francisco, Cal.
Smith, George O., Boston.
Smith, Thomas Page, Waltham.
Snow, Eugene A., Melrose.
Snow, Samuel T., Cohasset.
Sohier, Col. William D., Beverly.
Souther, Charles H., Jamaica Plain.
Spaulding, Edward, West Newton.
Speare, Alden, Newton Centre.
Spooner, William H., Jamaica Plain.
Sprague, Hon. Charles F., Brookline.

Sprague, Isaac, Wellesley Hills.
Springall, George, Malden.
Stearns, Frank W., Newton.
Stedman, Henry R., M.D., Roslindale.
Stevens, Hon. Moses T., Andover.
Stewart, William J., Winchester.
Stone, Charles W., Boston.
Stone, Prof. George E., Amherst.
Stone, George F., Chestnut Hill.
Strater, Herman, Roxbury.
Strong, William C., Waban.
Swain, Charles E., Roxbury.
Sweet, Everell F., Malden.

Talbot, Mrs. I. Tisdale, Boston.
Tarbell, George G , M.D., Boston.
Taylor, Charles H., Boston.
Taylor, Horace B., Portland, Me.
Temple, Felker L., Boston.
Tenney, C. H., Methuen.
Thayer, Mrs. Alice R., Boston.
Thayer, Eugene V. R., South Lancaster.
Thayer, Mrs. Eugene V. R., South Lancaster.
Thayer, John E., South Lancaster.
Thayer, Mrs. John E., South Lancaster.
Thayer, Nathaniel, Lancaster.
Thayer, Mrs. Nathaniel, Lancaster.
Thayer, S. V. R., Boston.
Thiemann, Hermann, Manchester.
Thomas, W. B., Manchester.
Thurlow, Thomas C., West Newbury.
Tilton, Stephen W., Roxbury.
Todd, John, Hingham.
Tolman, Benjamin, Concord.
Toppan, Roland W., Malden.
Torrey, Everett, Charlestown.
Tower, Miss Ellen May, Lexington.
Trepess, Samuel J., Glencove, L. I., N. Y.
†Turner, John M., Dorchester.
Turner, Roswell W., Boston.

Vander-Woerd, Charles, Waltham.
Vaughan, William Warren, Boston.
Vinal, Miss Mary L., Somerville.

Wakefield, E. H., Cambridge.
Walcott, Henry P., M.D., Cambridge.
Waldo, C. Sidney, Jamaica Plain.
Wales, George O., Braintree.
Walker, Miss Mary Sophia, Waltham.
Walley, Mrs. W. P., Boston.
Walsh, Michael H., Wood's Holl.
Walton, Daniel G., Wakefield.
Ward, Francis Jackson, Roxbury.
Ward, John, Newton Centre.
Ware, Benjamin P., Clifton.
Ware, Miss Mary L., Boston.
Warren, Samuel D., Dedham.
Washburn, Andrew, Hyde Park.
Watson, Benjamin M., Jamaica Plain.
Watson, Thomas A., East Braintree.
Watts, Isaac, Waverly.
Webber, Aaron D., Boston.
Webster, Hollis, Cambridge.
Weld, Christopher Minot, Jamaica Plain.
Weld, George W., Boston.
Weld, Richard H., Boston.
Weld, Gen. Stephen M., Dedham.
West, Mrs. Maria L., Neponset.
Weston, Seth, Chelsea.
Wheeler, Frank, Concord.
Wheeler, James, Brookline.
Wheeler, Wilfred, Concord.
Wheelwright, A. C., Brookline.
Wheelwright, Edmund M., Boston.
Whitcomb, William B., Medford.
White, Francis A., Brookline.
White, George R., Boston.
White, Joseph H., Brookline.
Whitney, Arthur E., Winchester.
Whitney, Ellerton P., Milton.
Whitney, Henry M., Cohasset.
Whittier, George E., Groton.

Whittier, William Benjamin, South Framingham.
Wigglesworth, George, Milton.
Wilbur, George B., West Newton.
Wilder, Edward Baker, Dorchester.
Wilder, Henry A., Malden.
Willard, E. W., Newport, R. I.
Willcutt, Levi L., Brookline.
Williams, Miss Adelia Coffin, Roxbury.
Williams, Benjamin B., Boston.
Williams, John Davis, Boston.
Williams, Philander, Taunton.
Willis, George W., Chelsea.
Willis, Joshua C., Roxbury.
Wilson, Col. Henry W., Boston.
Wilson, William Power, Boston.
Winthrop, Robert C., Jr., Boston.
Wolcott, Hon. Roger, Milton.
Wood, Edmund M., Natick.
Wood, William K., West Newton.
Woods, Henry, Boston.
Wright, George C., West Acton.
Wright, John G., Brookline.
Wyman, Oliver B., Shrewsbury.
Wyman, Windsor H., North Abington.

ANNUAL MEMBERS.

Members of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

Allen, Charles L., Floral Park, N. Y.
Alles, William H., Chestnut Hill.
Anderson, George M., Milton.
Arnold, Miss Sarah L., Newton Centre.
Atkinson, Edward, Brookline.
Ayres, Miss Helen F., Medford.

Badlam, William H., Dorchester.
Barker, John G., Melrose.
Barr, John, Wellesley.
Bigelow, Arthur J., Eastlake, Worcester.
Bigelow, Mrs. Nancy J., Southborough.
Bird, John L., Dorchester.
Blomberg, Carl, North Easton.
Bock, William A., North Cambridge.
Bolles, William P., M.D., Roxbury.
Boyden, Clarence F., Taunton.
Braman, George H., Newton.
Breck, Charles H., Newton.
Breck, Charles H. B., Brighton.
Brunton, Frank, Newport, R. I.
Butler, Edward, Wellesley.

Carpenter, Frank O., West Roxbury.
Carter, Mrs. Sarah D. J., Wilmington.
Cary, Miss Alice B., Lexington.
Chase, Joseph S., Malden.
Chase, Leverett M., Roxbury.
Chase, Philip A., Lynn.
Chubbuck, Isaac Y., Roxbury.
Clapp, Henry L., Dorchester.
Clark, John W., North Hadley.
Clark, Joseph, Manchester.
Clark, Theodore M., Newtonville.
Clinkaberry, Henry T., Trenton, N. J.
Collins, Frank S., Malden.
Comley, James, Lexington.
Coolidge, David H., Jr., Boston.
Coolidge, Sumner, East Watertown.
Cotter, Lawrence, Dorchester.
Cotting, Charles U., Boston.
Crosby, J. Allen, Jamaica Plain.
Curtis, Joseph H., Boston
Curtis, Louville, Tyngsborough.

Davis, Frederick, Boston.
Davis, Frederick S., West Roxbury.
Dawson, Charles Jackson, Newark, N. J.
Derby, William H., Revere.
Dolbear, Mrs. Alice J., College Hill.
Doran, Enoch E., Brookline.
Dorr, George B., Boston.
Doyle, William E., East Cambridge.
Duffley, Daniel, Brookline.

Eaton, Warren E., Reading.
Endicott, Miss Charlotte M., Canton.
Eustis, William Tracy, Brookline.
Ewell, Marshall F., Marshfield Hills.

Fenno, Warren, Revere.
Fisher, Sewall, Framingham.

Fitzgerald, Desmond, Brookline.
Fletcher, Fred W., Auburndale.
Forbes, William H., Jamaica Plain.
Francis, George E., M.D., Worcester.
Frost, Varnum, Arlington.
Fuller, T. Otis, Needham.

Gibbon, Mrs. James A., Boston.
Gill, Mrs. E. M., Medford.
Gilman, Hon. Virgil C., Nashua, N. H.
Grant, Charles E., Concord.
Grew, Henry Sturgis, Boston.
Grey, Thomas J., Chelsea.

Hall, Charles H., M.D., Corning, Cal.
Hall, Stacy, Boston.
Hallstram, Charles W., Boston.
Hargraves, William J., Jamaica Plain.
Harris, Frederick L., Wellesley.
Harrison, C. S., York, Nebraska.
Harrison, Thomas, Melrose Highlands.
Hartwell, Samuel, Lincoln.
Hatfield, T. D., Wellesley.
Hersey, Alfred H., Hingham.
Hersey, Edmund, Hingham.
Heustis, Warren H., Belmont.
Hill, J. Willard, Belmont.
Hinds, Warren D., Townsend.
Hobbs, George M., Boston.
Hollis, George, South Weymouth.
Houghton, George S., West Newton.
Hubbard, F. Tracey, Cambridge.
Huston, Miss Katharine W., Jamaica Plain.

Ireland, Robert D., Winthrop.

James, Robert Kent, Dorchester.
Jameson, G. W., East Lexington.

Keith, Mrs. Mary R., Washington, D. C.
Kelsey, Harlan P., Boston.
Kemp, William S., Brookline.
Kennard, Frederic H., Brookline.
Kenrick, Miss Anna C., Newton.
Kinney, H. R., Worcester.

Lancaster, Mrs. E. M., Roxbury.
Laurie, Robert, Newport, R. I.
Lincoln, Miss Agnes W., Medford.
Lomax, George H., Somerville.
Loring, Charles G., Boston.
Loring, William C., Beverly.
Lothrop, Thornton K., Boston.
Low, Hon. Aaron, Hingham.

Manda, W. A., South Orange, N. J.
Manning, A. Chandler, Reading.
Martin, William J., Milton.
Masten, Cornelius E., Dorchester.
Maynard, Charles, North Easton.
McLaren, Anthony, Westwood.
Meriam, Horatio C., D.M.D., Salem.
Metcalf, Dr. Ben H., Winthrop.
Milman, William, Roxbury.
Moody, Abner J., Boston.
Moore, George D., Arlington.
Morgan, George M., Boston.
Morison, George Abbot, Cambridge.
Morrison, William, Cohasset.
Moseley, Frederick Strong, Newburyport.
Munson, Prof. W. M., Orono, Me.

Newton, John F., Roxbury.
Nicholson, William, Framingham.
Norton, Michael H., Boston.
Norton, Patrick, Dorchester.

Olmsted, Frederick Law, Brookline.

Park, William D., Boston.
Parker, John, Newtonville.
Parker, Walter S., Reading.
Patterson, William, Quincy.
Peirce, George H., Concord Junction.

Petremant, Robert, Brooklyn, N. Y.
Pettigrew, John A., Jamaica Plain.
Pickman, Dudley L., Boston.
Pierce, Mrs. F. A., Brookline.
Plimpton, Willard P., West Newton.
Pray, James Sturgis, Cambridge.
Purdie, George A., Wellesley Hills.

Rea, Charles H., Norwood.
Rea, Frederic J., Norwood.
Rich, Miss Ruth G., Dorchester.
Rich, William E. C., Roxbury.
Rich, William P., Chelsea.
Richards, Mrs. P. D., West Medford.
Robbins, Oliver R., Weston.
Robinson, Walter A., Arlington.
Ross, Charles W., Newtonville.
Ross, Henry Wilson, Newtonville.
Rothwell, James E., Brookline.

Sander, Charles, Brookline.
Saunders, Miss Mary T., Salem.
Scott, Augustus E., Lexington.
Scudder, Samuel H., Cambridge.
Searles, E. F., Methuen.
Seaver, Edwin P., LL.D., Waban.
Sharp, Miss Helen, Boston.
Sharples, Stephen P., Cambridge.
Shaw, Hon. Edward P., Newburyport.
Shepard, Harvey N., Boston.
Sheppard, Edwin, Lowell.
Southworth, Edward, Quincy.
Squire, Miss Esther A., North Cambridge.
Stearns, Mrs. Charles A., East Watertown.
Stearns, Charles H., Brookline.
Stevens, Mrs. Mary L., Cambridge.
Stevens, Miss Mary O., North Andover.
Stone, Joshua C., Watertown.
Storer, Charles, Providence, R. I.
Story, Miss Sarah W., Brighton.
Strange, David T., Stoneham.
Sullivan, Michael, Revere.
Sutherland, George A., Roslindale.
Swan, Charles W., M.D., Brookline.

Tailby, Joseph, Wellesley.
Teele, William H., West Acton.
Terry, Rev. Calvin, North Weymouth.
Thatcher, William, Brookline.
Tobey, Rufus T., Roxbury.
Travis, Charles B., Brighton.
Tyndale, Theodore H., Brookline.

Vaughan, J. C., Chicago, Ill.

Warren, Samuel H., Weston.
Welch, Patrick, Dorchester.
Westwood, Thomas H., Jamaica Plain.
Wheeler, Henry A., Newtonville.
White, Maurice P., Roxbury.
White, W. Henry, Lowell.
Whitney, Joseph, Cambridgeport.
Whiton, Hon. Starkes, Hingham Centre.
Wilkie, Edward A., Newtonville.
Winter, William C., Mansfield.
Wolcott, Mrs. H. L. T., Dedham.
Wood, Mrs. Anna D., West Newton.
Wood, Elijah A., West Newton.
Wood, E. W., West Newton.
Woodford, Joseph H., Boston.
Woods, Henry F., Boston.

Young, Charles S., Newton Centre.
Young, E. Bentley, Boston.

Zirngiebel, Denys, Needham.

EXTRACTS FROM THE CONSTITUTION AND BY-LAWS.

SECTION XXII.

Life Members.

The payment of thirty dollars shall constitute a Life Membership, and exempt the member from all future assessments, and any Annual Member, having paid all dues, may become a Life Member by the payment of twenty dollars in addition thereto.

Annual Membership.

Every Annual Member, before he receives his diploma, or exercises the privileges of a member, shall pay the sum of ten dollars as an admission fee, and shall be subject afterwards to an annual assessment of two dollars.

SECTION XXIII.

Withdrawal or Discontinuance of Membership.

Any member may withdraw from the Society, on giving notice to the Treasurer and paying the amount due from him. Any member who shall neglect for the space of two years to pay his annual assessment, after due notice from the Treasurer, shall cease to be a member. The Treasurer shall give notice of such withdrawals or discontinuances to the Secretary, who shall erase such members' names from the list.

The attention of Annual Members is particularly called to Section XXIII.

HONORARY MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

Information, or any clew to it, is especially desired in regard to Joseph Maxwell, *elected in* 1830, *and* George W. Smith, *elected in* 1851.

Hon. George S. Boutwell, Groton.
H. W. S. Cleveland, Chicago, Ill.
Joseph Jefferson, Buzzard's Bay.
Major L. A. Huguet-Latour, M. P., Montreal, Canada.
Joseph Maxwell, Rio Janeiro, Brazil.
Donald G. Mitchell, New Haven, Conn.
Hon. J. Sterling Morton, Ex-Secretary of Agriculture, Nebraska City, Neb.
Baron R. Von Osten Sacken, Heidelberg, Germany.
Samuel B. Parsons, Flushing, N. Y.
George W. Smith, Boston.
Hon. James Wilson, Secretary of Agriculture, Washington, D. C.

CORRESPONDING MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly reporting to the Secretary the needed corrections.

Information, or any clew to it, is especially desired in regard to Alexander Burton, *elected in* 1829; S. Reynolds, M.D., 1832; *and* Francis Summerest (or Summerer), 1883.

ÉDOUARD ANDRÉ, Editor-in-chief of the Revue Horticole, Paris, France.

PROFESSOR L. H. BAILEY, Horticultural Department, Cornell University, Ithaca, N. Y.

JOHN GILBERT BAKER, F.R.S., F.L.S., Keeper of the Herbarium of the Royal Gardens, Kew.

CHARLES BALTET, Président de la Société Horticole, Vigneronne, et Forestière de l' Aube, Troyes, France.

PETER BARR, London, England.

ARCHIBALD F. BARRON, Turnham Green, London, W.

NAPOLEON BAUMANN, Bolwiller, Alsace.

D. W. BEADLE, 303 Crawford St., Toronto, Ontario.

PROFESSOR WILLIAM J. BEAL, Agricultural College, Michigan.

PROSPER J. BERCKMANS, Ex-President of the American Pomological Society, Augusta, Ga.

CHARLES E. BESSEY, Ph.D., Professor of Botany in the Industrial College of the University of Nebraska, Lincoln.

DR. CH. BOLLE, Berlin, Prussia.

JOHN CROUMBIE BROWN, LL.D., Haddington, Scotland.

PROFESSOR J. L. BUDD, Ames, Iowa.

WILLIAM BULL, Chelsea, England.

F. W. BURBIDGE, M.A., Trinity College Botanic Garden, Dublin, Ireland.

ALEXANDER BURTON, United States Consul at Cadiz, Spain, Philadelphia.

MAXIME CORNU, Director of the Jardin des Plantes, Paris, France.

DANIEL T. CURTIS, Dorchester.

REV. H. HONYWOOD D'OMBRAIN, Westwell Vicarage, Ashford, Kent, England.

W. T. THISELTON DYER, C.M.G., F.R.S., Director of the Royal Botanic Gardens, Kew, England.

PARKER EARLE, President of the American Horticultural Society, Roswell, N.M.

GEORGE ELLWANGER, Rochester, N.Y.

HENRY JOHN ELWES, F.L,S., F.Z.S., Colesborn, Andoversford, Gloucestershire, England.

WILLIAM G. FARLOW, M.D., Professor of Cryptogamic Botany, Harvard University.

B. E. FERNOW, Forestry School, Cornell University, Ithaca, N. Y.

HON. ROBERT W. FURNAS, Ex-President of the Nebraska State Horticultural Society, Brownville.

CHARLES A. GOESSMANN, Ph.D., LL.D., Chemist of the Hatch Experiment Station of the Massachusetts Agricultural College, Amherst.

GEORGE L. GOODALE, M. D., Professor of Botany, Harvard University, Cambridge.

OBADIAH B. HADWEN, President of the Worcester County Horticultural Society, Worcester.

PROFESSOR BYRON D, HALSTED, Botanist and Horticulturist at the New Jersey Agricultural Experiment Station, New Brunswick, N. J.

J. H. HART, Superintendent of the Botanic Garden, Trinidad.

DR. F. M. HEXAMER, Editor of the American Agriculturist, New York.

J. W. HOFFMANN, Colored State University, Orangeburg, S. C.

J. C. HOLDING, Ex-Treasurer and Secretary of the Cape of Good Hope Agricultural Society, Cape Town, Africa.

THE VERY REV. S. REYNOLDS HOLE, D.D., Dean of Rochester, Rochester, England.

SIR JOSEPH HOOKER, K.C.S.I., The Camp, Sunningdale, England.

JOSIAH HOOPES, West Chester, Pa.

GEORGE HUSMANN, Napa, Cal.

WILLIAM J. JOHNSON, M. D., Fort Gaines, Ga.

CHARLES JOLY, Honorary Vice-President of the Société Nationale d'Horticulture de France, Paris.

SIR GEORGE KING, Superintendent of the Royal Botanic Garden, Calcutta.

PROFESSOR WILLIAM R. LAZENBY, Department of Horticulture and Forestry; Secretary College of Agriculture and Domestic Science, Ohio State University, Columbus, O.

MAX LEICHTLIN, Baden-Baden, Germany.

G. F. B. LEIGHTON, President of the Norfolk Horticultural and Pomological Society, Norfolk, Va.

VICTOR LEMOINE, Nancy, France.

T. T. LYON, President of the Michigan Horticultural Society, South Haven.

DR. PETER MACOWAN, Director of the Botanic Garden, Cape Town, Africa.

DR. MAXWELL T. MASTERS, Editor of the Gardeners' Chronicle, London.

GEORGE MAW, Benthal, Kinley, Surrey, England.

T. C. MAXWELL, Geneva, N. Y.

THOMAS MEEHAN, Germantown, Pa.

DR. CHARLES MOHR, Mobile, Ala.

F. W. Moore, A. L. S., Curator of the Royal Botanic Gardens, Glasnevin, Dublin, Ireland.

Dr. Daniel Morris, C.M.G., D.Sc., M.A., F.L.S., Assistant Director of the Royal Botanic Gardens, Kew, England.

George Nicholson, Curator of the Royal Gardens, Kew, England.

Peter Nøvik, Secretary of the Norwegian Horticultural Society, Christiania.

William Paul, Waltham Cross, London, N.

Professor D. P. Penhallow, Director of the Botanic Garden, Montreal, Canada.

Henry Probasco, Cincinnati, O.

P. T. Quinn, Newark, N. J.

Cavalière Enrico Ragusa, Palermo, Sicily.

D. Redmond, Ocean Springs, Miss.

S. Reynolds, M. D., Schenectady, N. Y.

Benjamin Lincoln Robinson, Ph.D., Curator of the Gray Herbarium of Harvard University, Cambridge.

William Robinson, Editor of Gardening Illustrated, London.

Edgar Sanders, Chicago, Ill.

William Saunders, Horticulturist and Superintendent of Garden and Grounds, Department of Agriculture, Washington, D. C.

William R. Smith, Superintendent of the Botanic Garden, Washington, D. C.

Robert W. Starr, Port William, N. S.

Dr. Joseph Stayman, Leavenworth, Kan.

William Sumner, Pomaria, S. C.

Francis Summerest.

William Trelease, Director of the Missouri Botanic Garden, St. Louis.

Dr. Melchior Treub, Director of the Botanic Garden, Buitenzorg, Java.

H. J. Veitch, Chelsea, England.

William Watson, Assistant Curator of the Royal Gardens, Kew, England.

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TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1900.

PART I.

BOSTON:
PRINTED FOR THE SOCIETY.
1900.

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The following lectures have been circulated to some extent in the form of slips reprinted from the reports made by the Secretary of the Society in the "Boston Evening Transcript." As here presented, the lectures are, as far as possible, printed in full, and reports of the discussions following the lectures are added, these, where it appeared necessary, having been carefully revised by the speakers.

The Committee on Lectures and Publication take this opportunity to repeat what they have before stated, that the Society is not to be held responsible for the certainty of the statements, the correctness of the opinions, or the accuracy of the nomenclature, in the lectures and discussions now or heretofore published, all of which must rest on the credit or judgment of the respective writers or speakers, the Society undertaking only to present these papers and discussions, or the substance of them, correctly.

AARON LOW,
J. H. BOWDITCH,
E. W. WOOD,
Committee on Lectures and Publication.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, January 6, 1900.

A duly notified stated meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following appropriations, recommended by the Executive Committee on the 4th of November, 1899, came up for final action:

For Prizes and Gratuities for the year 1900:	
For Plants	$2,000.00
For Flowers	2,531.50
For Native Plants	186.50
For Fruits	1,732.00
For Vegetables	1,200.00
For Gardens	500.00
Total	$8,150.00

The President, as Chairman of the Executive Committee, reported that at a meeting of that Committee, held December 23, 1899, it was voted to recommend further appropriations for the year 1900 as follows:

For the Library Committee for the increase and preservation of the Library	$700.00
For the Committee on Lectures and Discussions, this sum to include the income of $50 from the John Lewis Russell Fund	250.00

For the Committee of Arrangements, this sum to cover all extraordinary expenses of said Committee .	300.00
For the Committee on School Gardens and Children's Herbariums, for Prizes	125.00
For the same Committee for incidental expenses .	75.00
For the Committee on Forestry and Roadside Improvement	150.00
For Salaries	3,000.00

The above report was accepted and the appropriations recommended were unanimously voted.

The President further reported that at the same meeting the Executive Committee appointed Charles E. Richardson to be Treasurer and Superintendent of the Building, and Robert Manning to be Secretary and Librarian, for the year 1900.

The President then delivered his annual address, as follows:

Massachusetts Horticulture.

It is well that we should occasionally look backwards from the several periods of success, in the progress forwards of citizens of this educational Commonwealth of Massachusetts in advancing horticulture.

We can too easily forget the wisely chosen words in our Charter, which forms the basis for our Constitution and By-Laws, and a motive for our General Rules and Regulations.

During the latter part of the year 1828, as I quote from writings of our first President, Gen. H. A. S. Dearborn, "a number of gentlemen of Boston, and the surrounding towns" decided that there was need of organized effort "for the purpose of encouraging and improving the science and practice of Horticulture, and promoting the amelioration of the various species of trees, fruits, plants, and vegetables, and the introduction of new species and varieties," and I have quoted their objects exactly as they can be found in the Act of Incorporation, as agreed to by the Legislature of 1829, and signed 12 June, 1829, by Governor Levi Lincoln.

Judge Buel of Albany, in 1828, wrote in his paper "The Cultivator" "Why do not the Boston gentlemen start a Horticultural Society?" "There is more talent in Boston for such an Association than in any place in the United States."

And so it was that "sixteen gentlemen," merchants with landed estates, and men who were students of rural affairs and directed the cultivation of their lands, met, and, we can say, founded this Horticultural Society. Others, with purely patriotic instinct, or with that spirit which sees where good can be done, and is ambitious to share in it, were induced to join with the "sixteen," and this Society soon became a reality.

On the 24th of February, 1829, those sixteen gentlemen met in the insurance office of Zebedee Cook, Jr., with that noted horticultural student, and lover of rural affairs, Hon. John Lowell, in the chair.

There were around him:— Robert L. Emmons, Boston; Benjamin V. French, whose estate was in Braintree, with model barn, fine apple and other fruit orchards, with farming and pasture lands; Gen. H. A. S. Dearborn, Roxbury; Cheever Newhall, a cultivator of fruits of great variety, with his lands situated in Dorchester; Enoch Bartlett, Roxbury; Samuel Downer, with estate in Dorchester near Savin Hill, noted for the high quality of fruits and vegetables raised there; Robert Manning and John M. Ives, both of Salem, and both noted as students and growers of fruits and trees of the highest quality; William Kenrick of Newton and Jonathan Winship of Brighton, to whose horticultural knowledge, and early nurseries of fruits and ornamental trees, the public were and are indebted for the advances that we find, I may say, in many ways in such lines of work today; Gen. W. H. Sumner of Dorchester; John B. Russell of Boston; and Andrews Breed and his brother Henry A. of Lynn, must not be forgotten among the early "sixteen" establishers of this Society. They builded better than they knew, and the responsibilities they have given us now rest upon our shoulders.

The first Act of 1829 gave the right to hold property to the value of $10,000 real and $20,000 personal, estate. That right has, from time to time, been increased until now it stands at a total of $1,000,000 real and personal, under an Act passed during my administration.

During the past year the Society has established a Committee with power to erect a building on one-half an acre of land, which has been purchased and is now the property of this Society.

Your Building Committee has, with the architects, given much time and thought to the matter. Had our plans been complete, when we were first authorized to act, it is estimated that the

amount appropriated would have been sufficient. The sudden and great rise in value of building material has caused your Committee to postpone further action until spring, in the hope that conditions may then be more favorable to us. We feel that a plan has been evolved that will be heartily approved, but, with the uncertainties that confront us, your Committee have decided that the plans, as they now exist, be not yet made public. Under these conditions we have an interest charge that makes it necessary, as at all like times of transformation, to ask economy in all possible ways to meet it, and it must be by the aid of our Committees that this can be done. The receipts from our halls and exhibitions were formerly a considerable sum, and that fact was proof of the large attendance of persons then at our exhibitions. Now the receipts from our halls and exhibitions are insignificantly small, and are indicative of the smallness of attendance at exhibitions, and the small amounts there received. We have now two exhibitions, one in spring and one in autumn, when entrance fees are charged and which are especially advertised; while we held twenty-three free exhibitions during the past year.

It seems to me that this Society would be in a position to do more advanced and beneficial work under our chartered responsibilities, and interest more people in our exhibitions, our lectures, and our library, if more, perhaps all, of our exhibitions, were with entrance fees. It may prove wise to decrease the number of our scheduled exhibitions. Our charity should, to be the best, be gauged to meet the intelligence in horticulture that we desire to promote. The mere payment of money prizes does not accomplish this, but it is the high standard that we set at our exhibitions, which will encourage advanced quality in plants, flowers, fruits, vegetables, etc. It should be to advance the quality of those, as we find them in the market, and hold them at a high standard, that we should direct our plan of management.

It was among the early efforts of our founders to do much of the work that now is among the duties of our endowed Agricultural Experiment Stations, National and State, namely, to first, encourage the growth of any varieties of fruits and vegetables that our markets lacked; second, to elevate the quality of those varieties; and third, when that had been well done by many whom I have named, and Mr. Wilder and others later, efforts were turned to the more æsthetic with plants, flowers, trees, shrubs, etc.

But now that so much is being done in these lines so admirably by commercial interests and endowed institutions, in our interests, it would seem that we could develop more fully and carefully both our library work, and exhibition work, and I urge thoughtful considerations on these lines.

It would also seem that we should, and could, advance the displays at, and plans for, our exhibitions as popular and paying, income-yielding Shows, in such location as we have chosen for our new home, and bring a large attendance from the metropolitan district. We have only to ask, I am sure, the coöperation of the Street and Steam Railways, and the business houses in this city to make such a plan a success.

I have, like many of you, been a member or manager at some of the largest exhibitions through New England, and in New York State and City, and have seen enough of similar exhibitions across the ocean and in parts of the West to know the possibilities in this direction, and also to realize that, with the vast population which can be centered at the location of our new home, such only need the proper incentive, intelligently put, to make our receipts worthy of such effort.

The early gardens of private estates yielded the fruits and vegetables for our early markets. Now there is a business in each. Plants and flowers next were developed on such estates, and distributed in like manner. Then, and next in order, a business in flowers grew up with a chief market in New York. Thus New York developed her own producing grounds and glass. Boston had developed as a consumer of flowers, and used her own product largely. The business of fruit, vegetable, plant, and flower culture has become a science, and a high quality now reigns in our markets.

That is largely what this Society was established to accomplish and it has done that work well. New and advanced varieties are what it has now to strive for; and by exhibits of highest quality alone can that be approached. Quality, the highest that the market can show, should be our standard, and by that are we to stimulate the inventive grower in all lines.

With our library in improved quarters the student is helped along such lines, and, by such ease of study, is he encouraged in his work.

Our Constitution and By-Laws, and our General Rules and Regulations, should be fully lived up to; and should by frequent study and careful inspection be kept abreast of our needs, and at the standard for the times in which we live, the basis thereof to be the Charter that we hold from the Commonwealth of Massachusetts.

On motion of Ex-President William H. Spooner, it was voted that a copy of the President's address be requested for publication.

William J. Stewart made the following motion:—That the President be requested to appoint a Committee of five members to report at some future meeting whether there are any changes which may appear to them desirable to make in the Constitution and By-Laws. This motion was carried. Mr. Stewart requested that he might not be appointed Chairman of the Committee.

Ex-President William C. Strong presented the following vote:—Whereas it is believed that the cost of constructing a new building upon the land recently purchased by this Society will largely exceed the estimated cost, it is therefore voted that the Building Committee be instructed to submit plans for a new building to the Society for its inspection and approval, before any contracts are made for such work. This motion was carried.

The President announced that the Programmes of Lectures for the present season were ready, and that the first would be delivered by Professor Byron D. Halsted of the New Jersey Agricultural College Experiment Station, New Brunswick, N. J., on the next Saturday.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:—

Mrs. Oliver Ames, Senior, of North Easton.
Miss Susan E. Ames, of North Easton.
Lamont G. Burnham, of Essex.
Walter Cutting, of Pittsfield.
Edmund C. Eastman, of Brookline.
Robert M. Morse, of Jamaica Plain.

Adjourned to Saturday, February 3.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 13, 1900.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following lecture was delivered on the John Lewis Russell foundation:

THE RUSTS OF HORTICULTURAL PLANTS.

By Professor BYRON D. HALSTED, Botanist and Horticulturist at the New Jersey Agricultural Experiment Station, New Brunswick, N. J.

After accepting the honored invitation to open this annual course of lectures and being informed by the Chairman of the Lecture Committee that my subject in a general way was "Parasitic Fungi," I naturally sought my file of the TRANSACTIONS of your Society.

It was found that a series of annual lectures upon fungi began nine years ago when Dr. Farlow presented his exposition of the "Diseases of Trees Likely to follow Mechanical Injuries." In 1892 the much lamented Professor J. E. Humphrey, then of the Agricultural Experiment Station of your State, gave you his lecture upon "Fungous Diseases and Their Remedies," in which the nature of fungi was described and some of the various forms considered. The next February brought you Professor Galloway of the United States Department of Agriculture with his paper upon "Combating the Fungous Diseases of Plants," in which you received the latest advices as to formulas for fungicides and the best methods of applying the mixtures. In 1894 Dr. W. C. Sturgis of the Connecticut Experiment Station chose for his subject the single word "Fungi," and under it gave a full explanation of the low group of plants embraced by his title, but not overlooking that side of the subject that deals with the remedies for, and the destruction of fungi. The next year the speaker was privileged to present a paper upon "Fungous Diseases of Ornamental Plants," and a year later Professor Atkinson of Cornell University gave a lecture upon "Some Tendencies and Problems in the Evolution of Species Among Parasitic Fungi." This was followed in 1897 by Dr. E. F. Smith's address on "The Spread of Plant Diseases" in which some of the ways that parasitic

organisms are disseminated were considered. In 1898 "The Resistance of Plants to Parasitic Fungi" was the title of the lecture by Dr. E. A. Burt of Middlebury College of Vermont and a year ago Professor Sedgwick of your Institute of Technology gave his paper, "Ancient and Modern Theories of Diseases with Special Reference to Diseases of Plants caused by Parasitic Fungi."

This review by title of the nine preceding lectures has been made in justification of my assumption that the majority of those present today are sufficiently familiar with fungi to warrant me in selecting one of the leading groups and proceeding at once to its consideration without any further preliminary parley.

The fungi are separated into many families and of these one of the more distinct and conspicuous of the groups of the parasitic species is the *Rusts* or *Uredineae*.

Statistics are dry, and tables of figures are not apt to produce laughter; therefore in passing it will only be said that the rusts include about fifteen hundred species, arranged in twenty-five genera. While there may be some striking differences as seen by the naked eye the rusts are in all their details strictly microscopic. They infest nearly all groups of plants and are met with upon stem, leaf, flower, and fruit, although seldom showing their presence on any subterranean portions of the host.

Structurally, like most of the fungi, the rusts consist of slender threads called the mycelium, which is the vegetative portion, and the reproductive bodies known as the spores.

An interesting feature of the Uredineae is that of the different forms of spores produced by the same species, and these are so unlike that it was only after full demonstration that they have been associated as stages in the life cycle of the same rust. Furthermore these different forms may grow only upon widely unrelated host plants. This Polymorphism is the foundation of some of the relationships between plants observed by farmers and others centuries ago. Permit me to quote a few lines from the Province Laws of Massachusetts for 1736–1761. "An act to prevent damage to English grains arising from barberry bushes.

"Whereas it has been found by experience, that the Blasting of Wheat and other English Grain is often occasioned by Barberry bushes, to the great loss and damage of the inhabitants of this province:—

"Be it therefore enacted by the Governor, Council, and House of Representatives, that whoever, whether community or private person, hath any barberry Bushes standing or growing in his or their Land, within any of the Towns in this Province, he or they shall cause the same to be extirpated or destroyed on or before the thirteenth day of June, Anno Domini One Thousand Seven Hundred and Sixty.

"Be it further enacted that if there shall be any Barberry Bushes standing or growing in any land within this Province, after the said 13th day of June, it shall be lawful, by Virtue of this Act, for any Person whosoever to enter the Lands within which such barberry Bushes are, first giving one month's notice of his intention so to do to the Owner or Occupant thereof, and to cut them down, or pull them up by the root, and then to present a fair account of his labour and charge therein to the owner or occupant of the said land and if such owner or occupant shall neglect or refuse by the space of two months next after the presenting of said account, to make to such person reasonable payment as aforesaid, then the person who cut down or pulled up such bushes, may bring the action against such owner or occupant, owners or occupants, before any Justice of the Peace, if under forty shillings, or otherwise before the Inferior Court of Common Pleas in the County where such Bushes grew, who upon proof of the cutting down or pulling up of such bushes by the person who brings the action, or such as were employed by him, shall and is hereby respectively empowered to enter up judgment for him to recover double the value of the reasonable expense and labour in such service and award execution accordingly."

At the time of the above enactment the nature of the influence of the barberry upon the grain was not known. It was often observed that the grain was more rusted in the vicinity of the bushes than elsewhere and many theories arose as to the cause of this. It seemed evident that there was something given off by the barberry and some supposed it was the fragrance of the blossoms or possibly the pollen that spread the disease. Marshall in his "Rural Economy" written in 1781 says: "It has long been considered as one of the first vulgar errors among husbandmen that the barberry plant has a pernicious quality (or rather a mysterious power) of blighting wheat which grows near it." Here is

another observation made in England more than a century ago; "The part (of the grain field) affected resembled the tail of a comet, the bush itself representing the nucleus, on one side of which the sensible effect reached about twelve yards, the tail pointing towards the south-west so that probably the effect took place during a north-east wind."

It was in 1805 that Sir Joseph Banks in his paper upon "Wheat Mildew," in considering the relationship above mentioned, believed by farmers but discredited by botanists, wrote as follows: "It is not more than possible that the parasitic fungus of the barberry and that of wheat are one and the same species, and that the seed is transferred from the barberry to the wheat."

A Danish schoolmaster, Schoeler by name, holds the honor of first demonstrating the connection between the barberry rust and that upon the wheat. Schoeler's experiments began in 1807 and in 1816 he performed the following interesting work of inoculation. "Some fresh branches of the barberry bush having rusty leaves upon them were cut off, put into a box, and carried to a rye-field, where the rye was still moist with dew. The rusty barberry leaves were applied to some of the rye plants — to the straw as well as to the leaves — by rubbing them with the underside of the affected barberry leaves, until he could see some of the 'yellow dust' (spores) of the fungus adhered to the rye plants." The infected rye plants were then marked by tying them to sticks driven into the ground. In five days' time these plants were badly affected with rust, "while at the same time," says Schoeler, "Not one rusty plant could be found anywhere else in the whole rye-field."

In our present consideration of the subject we have gone far enough so that the four forms, or kinds, of spores in the life cycle of the common wheat rust (*Puccinia graminis* Pers.) need to be mentioned by their botanical names. First we find upon the wheat stubble, left standing in the field, dark streaks composed of the final spores (Teleutospores) of the previous year's production. These carry the rust fungus through the winter and germinate when the warm moist weather of spring comes, either upon the stubble or elsewhere as they may have fallen, but not necessarily upon any living host. These teleutospores produce first a slender colorless filament which soon bears a few small oval bodies into

which the protoplasm of the original brown thick-walled spore is gathered. These sporidia fall easily from their attachment and are carried far and wide by the winds. When they fall upon the young unfolding leaves of the barberry they germinate and send their slender filaments into the leaf, there to multiply, pilfer from the tissue of the host, and soon produce a thickening of the infested portion of the leaf. Shortly the epidermis upon the underside of the leaf is ruptured and a cluster of beautiful cups appears, each tiny cup being filled with orange angular spores. This is the barberry cluster cup, the old *Æcidium berberidis* Pers., of earlier botanists. By this time spring is advancing and the grain fields are reaching a period of rapid growth. The breezes whirl the dry spores out of the cups upon the barberry leaves and carry them in all directions and in countless numbers. Some will chance to fall upon the moist surface of the wheat plants, where they quickly germinate, produce infection, and, after vegetating for a brief period within the succulent tissue of the host, a genuine rust spot is produced with its multitudes of oval orange-colored spores,—the *Uredo graminis* Pers. of earlier days. This rust, so destructive to the summer grains, repeats its own form with great rapidity and for a time, depending upon the kind of climatic conditions that prevail; but with us in New England it is followed near the close of the season with the dark form of spore produced in the same rifts of the skin and forming the "weather stains" so called of the stubble with which this outline of the life cycle was begun. As this is the final form its botanical name *Puccinia graminis* Pers., is retained, and it includes the *Æcidium berberidis* Pers., and the *Uredo graminis* Pers., as forms of its own. In other words the representatives of three different genera are all brought together as forms of a single species. This Polymorphism is not very unlike the three stages of larva, pupa, and imago of the butterfly or beetle and the teleutospore stage corresponds in a measure with the final form attained by the insect.

We are now ready to consider the experiments of De Bary, the famous German botanist, who, in 1864, acting upon a popular belief of European farmers and the field inoculations of Schoeler, made a complete scientific demonstration of the unity of the species upon the wheat and the barberry. Thus he sowed the spores of the wheat rust upon the barberry and produced the cluster cup

form and the following year the converse inoculation was successfully made with the spores of the barberry rust upon the grain. De Bary's results have been reached by many others, so that today the old theory of a "noxious effluvium" exhaled by the barberry is replaced by a clearly demonstrated fact.

The working out of the double hosts among the Uredineæ has been a fascinating subject of study for thirty-five years and a long list of the rusts have their associate forms established, while every year adds new combinations, some of which are of special importance as bearing upon methods of checking the rusts of cultivated plants.

Before leaving this portion of the subject, and to illustrate the bearing of a knowledge of the polymorphism of rusts upon treatments for the same, let us glance briefly at some of the orchard rusts. There is one upon the apple that in some places is very destructive. The speaker has seen whole orchards with the foliage of a bright orange, scarcely a leaf escaping attack, and even the fruit and young twigs infested. As found upon the apple it is the stage corresponding to that of the barberry—the cluster-cup form. The teleutospore stage infests the common red cedar and there the fungus develops chocolate-colored galls a half inch or more in diameter which become large and gelatinous when the rains of spring come, and then they might possibly be mistaken at a distance for chrysanthemums of an orange color. Here we have the apple rust fungus, with a very long name, *Gymnosporangium macropus* Link., infesting two plants, namely, apple and cedar, which are as widely separated in kinship as the barberry and wheat infested by *Puccinia graminis* Pers. In the former the uredo form is unknown and probably omitted in the cycle. The round for the season with the cedar-apple rust runs as follows: The fungus exists in the winter as filaments interlaced between the abnormally large and numerous cells of the host in the brown gall. As spring comes on spores upon long stalks are produced, imbedded in a jelly that when wet swells up into the long orange gelatinous horns that project from all sides of the hard gall. These spores quickly produce germ tubes and sporidia, and the latter are carried to the young apple leaves as they are unfolding. Following the inoculation there is a discolored thickened patch produced in the leaf and several deep cups and multitudes of

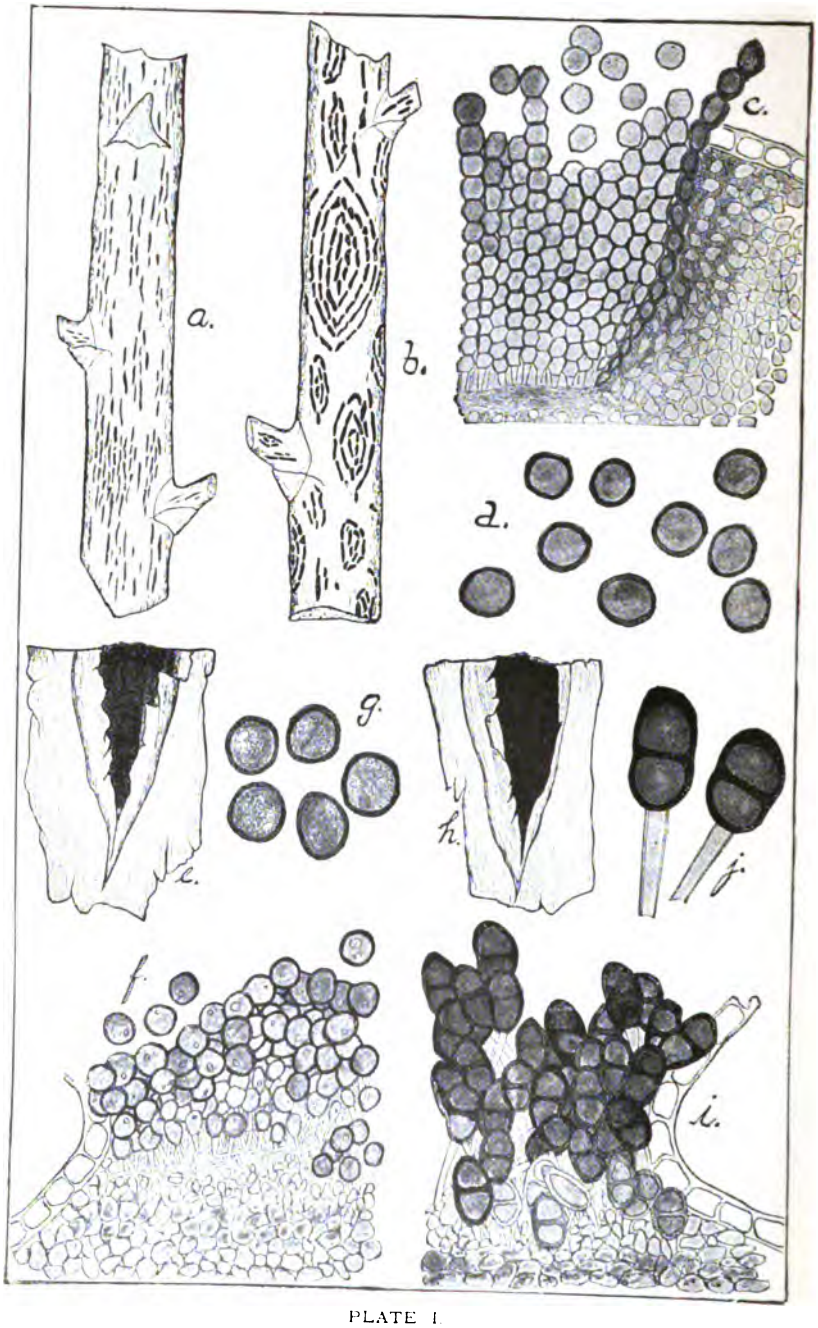

PLATE I.

The Various Forms of the Asparagus Rust.

spores within. As remarked before, there is no known form in this fungus corresponding to the rust of wheat, and the spores from the apple leaf cups go to the cedar and start new galls which attain a half inch in diameter, more or less, and pass the winter as such.

The quince has a rust that is sometimes quite ruinous to the young fruits, which it distorts and dwarfs. This fungus also infests the cedars, but is easily distinguished from the common one of the apple. It is often found upon the fruit of the hawthorn and the June-berry.

Without attempting more than to give a few instances let us pass from the grain field and orchard to the vegetable garden and select one rust there for a brief consideration. That of the asparagus will perhaps be most to our interest, as it is very destructive, a new comer, and has certain points of importance not previously mentioned. Some words upon the history of this rust in America are to our purpose as showing, among other things, the rate with which a destructive fungus may be disseminated.

It was in August, 1896, that the first specimens of American grown asparagus rust came to my notice, they having been brought to the New Jersey Experiment Station with the statement that the beds from which they were gathered had ripened prematurely and the condition was alarming. A printed circular stating the nature of the trouble, with suggestions for preventive measures, was sent out to the agricultural press and the botanists and horticulturists of all other experiment stations, and from these several sources it was determined that the asparagus rust was seen that year for the first time in New England, Long Island, New Jersey, and Delaware. In 1897 it was gathered, by wide correspondence, that the rust had spread only along the Atlantic Coast, and as far south as South Carolina, where it became a genuine source of alarm in the large asparagus fields around Charleston; but as yet the vast interior and western United States were free from the rust. In 1898 the disease had spread westward as far as Michigan and southward to Georgia, with a full measure of it in Pennsylvania. During the year just closed (1899) with careful observers in each state and territory one is able to add Ohio, Indiana, Illinois, and Kansas to the infested area, and, within the past month it has been reported from North Dakota.

It is not likely that the spread of this disease has been phenomenally rapid, but on account of its first coming into the country at this late date when the Experiment Stations are established and spies, so to say, may be set upon its movements, it becomes possible to note its progress both in direction of the invasion and the rate of its advance. In order to offer some clue as to the method of the dispersion of this rust it may be interesting to mention in passing some recent personal observations in the field. For example, there were two asparagus beds standing at right angles to each other and separated by a small place containing a house and barn. In position it was like the letter T, but with the horizontal top piece somewhat removed from the upright. One bed, represented by the upright of the T, had not been cut late and was very badly rusted at the time of my inspection. The other bed had its cutting continued late for market and a young vigorous growth of brush stood about hip high. Looked at from one side all the main stems and branches were showing the rust just breaking through the skin. On the opposite side the same stems had very little of the rust in sight. The rusted side was toward the old bed and it was further observed that the sides of greatest rustiness made an arc the radii of which centered in the old bed. The observation told much, for it demonstrated that the infection was aerial and not through the roots. It showed that the old bed was the source of the contagion and that the wind was the vehicle of transfer. The asparagus plants of the later bed that stood in the line of the house were protected by it and showed much less rust, and the same was true of the barn. There was a narrow belt between the two buildings where the disease was abundant and here the spores had uninterrupted access to the young asparagus plants.

This complete demonstration of the method of inoculation leaves it easy to see how the disease may be carried for long distances by the same agency. It has been frequently observed that beds of asparagus standing alone, and surrounded by forests, are much less likely to be badly rusted than those in the full open. If the barberry-covered rocky hillsides of New England can furnish the spores to inoculate with rust all wheat fields within the sweep of New England winds, it goes without further argument that the

rust of the asparagus may have its spores carried as far as the breezes go that blow across an infected field.

The asparagus rust fungus (*Puccinia asparagi* D. C.) introduces us to a species of rust which, while having its full list of forms, namely teleuto, æcidial, and uredo stages, has them all upon the same kind of plant and therefore its spread is in no sense dependent upon any other host.

The cluster cup stage has not been at all common in America, but wherever occurring has been upon early plants in the fence row or upon uncut beds. When an ordinary plant is first attacked the genuine yellow rust is only in evidence, but shortly after in the same pustules the darker final spores are developed and in this stage the fungus hibernates.

With the wheat rust one scarcely needs to remark that a remedial measure is the destruction of the barberry bushes, or in like manner for apple rust the removal of all cedar trees near apple or quince orchards that are troubled with their respective rust. But there is no such hope in case of the rust of the asparagus.

From what has been said previously concerning the deep-seated nature of the rusts it might be expected that they are not very amenable to such treatments as prove effective with the more superficial fungi like the mildew.

The farmer, orchardist, trucker, and florist, while not proscribing spraying, need to be active along other lines as well. The consideration of the asparagus rust brings this very practical subject forward at this time. It has been the speaker's privilege to make a test of spraying upon a scale and over a sufficient period to teach him that the gain does not greatly exceed the loss. There are many sides to a question like that of spraying with fungicides. The asparagus has a different foliage from ordinary plants; in fact, the brush is made up of needle-shaped branches with a very smooth surface to which the Bordeaux mixture does not closely adhere. More than this the tips of the branches are so fine and delicate that they are burned to some extent by the ordinary mixtures.

It may be well for us here to go a step further in this matter of spraying to check the asparagus rust. The experiment began on June 16th, 1897 and after ten sprayings closed on October 5th. If we assume the rustiness of the untreated plants as one hundred it is calculated that the fungicide reduced the disease fully one

quarter. The Bordeaux mixture was applied with a knapsack sprayer and the cost per acre was $21.76 for the ten applications. In 1898 the experiment was repeated but the rust was not abundant upon the untreated plants. It was shown, however, that the fungicide materially reduced the amount of the disease, but the "brush" was somewhat injured. Similar results have been obtained for 1899 upon the same asparagus bed, the rust being reduced from sixty-six per cent to forty-nine per cent, and the conclusion seems warranted that spraying with the standard Bordeaux is not entirely satisfactory.

The bed under experimentation consists chiefly of six varieties of asparagus, namely Barr's Mammoth, Elmira, Columbian White, Palmetto, Conover's Colossal, and Giant Brunswick with a little of Moore's Cross-bred and Giant Argenteuil; the latter are younger plants and not fully comparable with the others. During the first year it was strikingly evident that the single rows of Palmetto as they stood with other sorts upon either side were the least rusted of all. This fact has been observed during all the three years that we have had the rust, not only in the experiment grounds, but in all parts of the State where the Palmetto is grown. In fact, to my mind, the chief information of value in connection with the study of the asparagus rust in New Jersey has been the determination of the greater resistance of the Palmetto, and also of a "French stock" grown as yet only to a very limited extent.

Two years ago the asparagus growers were very much discouraged and a large fraction of the beds in the State were abandoned or torn out, but the determination of the resistant qualities of the Palmetto has effected a change and now new beds are being set in large numbers — in fact, to the full extent of the Palmetto stock, no other being used excepting the "French" variety. In short the advent of the rust has not been so harmful as was at first feared, for the threatening enemy has led to a more careful consideration of their fields by the better growers, while the careless have in many cases turned their attention to less exacting crops. Growers are noting the good effect of clean, high culture upon the vigor of the plants and are using considerable quantities of commercial fertilizers, particularly nitrate of soda, to produce a strong growth of top that insures a crop when the absence of it might

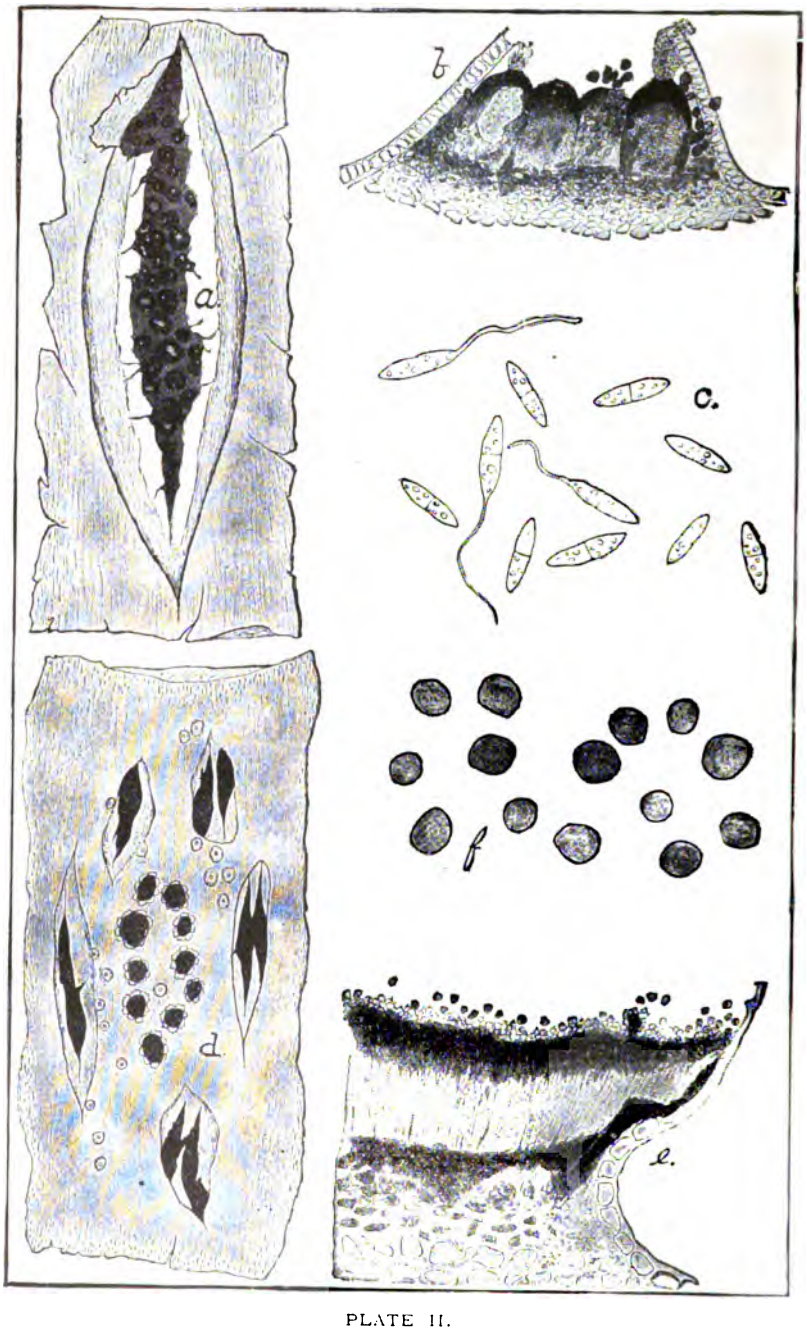

PLATE II.

Natural Enemies of the Asparagus Rust.

result in a failure. Asparagus growers are working for a more vigorous, but a shorter life of the bed and a better rational treatment generally.

There is a hope of a natural enemy coming upon the rusts and checking them. There are insects that feed freely upon the spores and sometimes clean out the minute pustules of their dusty spores. Certain species of fungi are parasitic upon the rusts, and in the study of the asparagus rust two were met with, one of which (*Darluca filum* Cast.) was so abundant as to make it possible that it will prove a material check to its fungous host and possibly remove any anxiety connected with the ravages of the rust.

The recommendation to burn the rusted brush in autumn as soon as it loses its deep green color has been heeded by many with varying results, some claiming that it was an advantage, while others consider it of little use. Theoretically it is the proper thing to do, as it removes the brush after it is no longer of any particular value in making food for the new spring shoots, and the myriads of spores are thereby destroyed before they spread the disease, as they would be quite apt to do the coming spring.

Please observe the language used—"quite apt"—for there is a lack of certainty in it all. With rusts as with fungi generally the surrounding conditions play so very important a role that one cannot predict an outbreak simply because the spores are at hand.

This subject of favoring circumstances may come up later, and here let us consider one or two rusts that trouble the florist. To go into the field and talk of the grain rust, into the orchard and consider the apple rust, and into the vegetable field and speak of the asparagus rust, and omit the flower garden and greenhouse would be showing a partiality not at all in keeping with the composition of this audience and the venerable Society it represents.

There are at least three rusts that have made themselves prominent among ornamental plants during the past few years. A leading trouble in the flower garden is the Hollyhock Rust (*Puccinia malvacearum* Mont.) which came into this country from Chili in 1890, and spread with remarkable rapidity and fatality. It develops upon all portions of the hollyhocks, as the leaves, stem, and floral parts, causing them all to sicken and die. This rust is

a good illustration of those that have only the teleuto form of the spore and the sporidia that grow directly from it. In other words the cluster cup and uredo stages are omitted and the first state becomes the last, so far as spore development upon the host is concerned. The great rate at which the fungus spreads is to be accounted for largely because it hibernates as the living mycelium in the hollyhock, the young leaves of which exist as a rosette through the winter. As the warm moist weather comes the orange patches upon the foliage enlarge and quickly develop spores that almost at once form the sporidia which rapidly spread the rust to other parts of the hollyhock. There is no resting period in the teleutospore condition, which is reason enough for a rapid propagation of the rust, but when added to this is the absence of two stages in the life cycle there is no wonder that when a hollyhock is once affected the doomed plant is quickly ruined provided that the conditions are favorable. This last clause is one of no small consequence, and this rust becomes a good illustration of a general fact that unless warmth and moisture as well as spores abound the rust will not thrive. It is not unusual to find the upper surface of a leaf stalk rusted some days in advance of the lower side, due to the dropping there of spores from a diseased leaf above. This observation brings out the idea that water is one of the common carriers of rust spores and that it furnishes the requisite moisture for their germination.

Another observation that may be made in connection with the hollyhock rust is its scarcity at certain times. For example, in 1898 there was an abundance of hollyhock rust, while a year later there was almost none upon plants badly rusted the year before. It may be said in explanation that the conditions were unfavorable for the disease and the health of the plants was restored. Good growing weather with no excess of moisture is the best ally of the victim, and if it comes in time many kinds of plants will recover from an attack that might otherwise be disastrous.

Another new fungous enemy that has troubled the American florists seriously is that of the Carnation Rust (*Uromyces Caryophyllinus* Schr.) which reached us, probably from Europe in imported stock, in 1891 and is still in evidence in nearly all parts of the country. The fact that this rust grows upon a prominent commercial floral plant makes it worthy of a word in passing. The

conditions here are quite different from those in the open garden, for heat and moisture and a more or less confined air quite constantly obtain in the greenhouse, thus supplying the surroundings favorable for the growth and spread of the rust. The spray from the hose in watering, for example, is one of the best means of carrying the spores from a diseased to a healthy plant.

The experiments that have been made with this disease are somewhat limited, but they go to show that preventive measures are better than attempted cures. From the fact that the carnation is largely an indoor plant and propagated by cuttings it goes without saying that the stock should be healthy from which the cuttings are taken, and no rusted plants should be introduced into a house previously free from the rust. One rusted plant, under the circumstances of greenhouse growth, may be ample to inoculate a whole bed, and this accounts for the sudden outbreak of the rust in houses hundreds or thousands of miles apart. The rusted stock of some commercial house may go into a dozen widely separated states in the Union and all carry the disease. In this case one does not need to charge the transfer to the winds, and the importance of great carefulness in purchase and in propagation goes without saying. These and various sanitary precautions are now becoming understood by florists. The destructive virus with this rust as with others is the brown dust upon the rusted leaf, and every precaution should be taken to prevent its formation and to effect its immediate destruction if it does appear. Carnation growers are gradually acquiring a knowledge of the susceptibility of varieties and are finding some sorts in this respect much more valuable than others.

The latest claimant for our attention among the greenhouse rusts is that of the chrysanthemum. As yet the advent of this importation from Europe has not been traced back of 1896, when it was found by a Mr. Hastings of Fitchburg, Mass., and reported by Dr. Stone in the Ninth Annual Report of your Experiment Station. From foreign correspondence it is gathered that it was rampant in France and then spread throughout England, where it was very destructive, particularly in 1898. With us it has increased quite rapidly during the past three years and during the last one it has become decidedly troublesome. The plants when affected remain small and the foliage is blotched with large circular

rust spots. Up to the present time only the uredo form has been met with upon American plants and therefore it is impossible to be sure of the species. While this is interesting from the standpoint of the botanist it may be of no great economic importance. However, if the other forms are associated with the dandelion, or similarly related common wild species, the bearing of this knowledge upon the checking of the rust is at once apparent.

This disease is so recent that with us there is very little in the line of remedies that has been determined experimentally. It being a greenhouse plant, propagated by cuttings, the precautionary measures are practically the same as with the carnation. The two rusts are, however, very distinct, belonging to different genera of fungi and not transmissible from one of these host plants to the other. In other words, the Daybreak carnation, so susceptible to rust, may be tolerated, in its worst diseased condition, close by the chrysanthemums without any risk of infecting the latter, or contrariwise the Golden Wedding chrysanthemum, loaded with rust, may be placed in the midst of a healthy bed of carnations without any danger of introducing the rust to the pinks.

In the treatment of our subject we have made a few selections of typical rusts from widely separated host plants, and have endeavored to bring before the hearers some of the more important points connected with one of the leading groups of destructive fungi.

We have seen that the rusts infest herbs, shrubs, and trees. The forests are not exempt from them and even the giant pines are destroyed by rusts. May I be permitted to say that only last summer I saw in British Columbia almost endless amounts of a rust (*Chrysomyxa Ledi* Alb. & Sacs.) upon *Ledum Grœnlandicum* Oeder, and associated with it were great "witches' brooms" or "crows' nests" in the fir trees (*Abies balsamea* L.), caused by a form of the Ledum rust. Here, in an almost untrodden wilderness, where for half the year all is shrouded in snow and ice, this very destructive rust had established itself long centuries ago, and the human mind is left to speculate as to the precise reason why this particular association of fungus and its two hosts had been perfected. If we could answer for this instance in the wilderness, the clue would doubtless be found for combinations between wheat and barberry, the apple and cedar, and the many other known associa-

tions, to say nothing of the greater number whose life cycles have not been even studied.

From the instance of the "witches' broom" above mentioned it is evident that the rusts may not only greatly distort the host, but are often perennial when upon plants that live on through the years. Similar "crows' nests" are to be met with in our own cedar trees, and these are due to rusts that live in other forms upon various forest and orchard trees. This perennial nature of the rusts has its very practical bearing upon their destruction when upon cultivated plants. The blackberry and raspberry rust is one of the most serious pests to growers of bush fruits. It shows itself in early spring, dwarfing the cane and ruining the foliage. When such an infected plant is cut to the ground the new shoots, springing from the stock, will also become rusted like the first growth of the year. Actual microscopic examination of the tissue of the root demonstrates the presence of the perennial mycelium. With these facts before us it is not strange that the multitudes of experiments made to eradicate the disease by spraying the plants result in failure. The Bordeaux or other mixture when upon healthy plants may help to prevent the spread of the disease; but when once within the tissue of root and stem it is out of reach of spraying compounds. It goes without any argument that all such rusted plants need to be dug up and destroyed root and branch, and the earlier this is done the less likelihood there will be of the infection spreading by means of the spores. The burn heap is one of the best adjuncts of a well equipped horticultural establishment. It excels greatly the rubbish pile. Ashes may be blown about by the winds and no serious inoculations follow from them.

The "seed-treatment," so called, for the prevention of diseases in grain fields, while of great value with the smuts is not effective with the rusts, and for reasons that are not far to seek. The oat or wheat smut spores are produced in the grain itself and healthy grains become smeared and dusted with the spores. The smut fungus infests the grain plant when it is a small seedling and at or near the surface of the ground. When this young stage is past the plant is exempt. The adhering spores are therefore well situated to inoculate the seedling as it unfolds.

On the other hand the rust is not produced in the grains, and infests the plant directly through the leaves and by means of

spores that come to them in the winds directly from some diseased plant. The only way to check the rust by treatment with a fungicide is to spray the plants bodily when the spores are ready to alight and produce infection, or the plants that are furnishing the virus, or both. This treatment is not considered practicable for field culture and is usually not very effective in the orchard or fruit garden. The spraying for the rust upon stone fruits (prunes) in California is somewhat exceptional.

No treatment of the seed, the soil, or even the growing plant itself can be generally relied upon, and consequently while not discarding the spray pumps other means should be considered.

With out-of-door plants but little can be done to modify the conditions under which the rusts flourish. Certain seasons will provide the humidity and warmth at just the right time to induce infection while others may furnish the opposite and the crop is comparatively exempt. Until the weather is under man's control we may not hope to be rid of the army of rusts that prey upon our crops. The question is somewhat different with the greenhouse where heat and moisture are more within man's hands. But even here the conditions that favor the most profitable growth of the desired product are the ones that conduce to the spread and propagation of the diseases of the same. However, there is much in the way that the house is ventilated and the water applied that will help to keep down the rusts. We all know that close attention to all the minor details of health for the plants will go far towards success in the face of contagious diseases to which the plants may have been exposed.

There still remains the resort to varieties that are least susceptible. The importance of this has been shown in a practical way in the body of this paper when considering the rust of the asparagus. The Palmetto variety is so far ahead of the ordinary sorts, probably due to a greater deposit of wax upon the surface of the stems, that it is already accepted as the best variety to be set. Time may show us the way to rust-resistant grains — already talked of but doubtfully obtained—and to orchard trees and bushes that are rust proof. They may come by observations, for it is a well established fact that there are great differences,— or by the breeding in of a blood that will bring exemption. So long as differences of susceptibility to rusts exist in plants capable of

breeding there remains the grand possibility of vanquishing the enemy by fortifications made by the hybridizer's art.

As previously mentioned there is hope that natural enemies may assist the crop grower.

The last resort in all cases when rust is suspected is to furnish the best possible conditions for growth of the crop, bearing in mind that vigilance is especially demanded when the foe is at hand. Any neglect — as lack of light, air, food, or water, or a surplus of the same — may engender a weakness that will cause the plants to fall a victim at the first opportunity.

As when some contagious disease has invaded the human dwelling and is followed by a thorough cleansing of the rooms, even to a change of carpets, and paper upon the walls, so when there is an outbreak of a rust in a plant-house there needs to be a renovation as thorough, because the germs are as insidious and lasting. In connection with the subject that has been considered at the present hour there is no point that is made with greater earnestness than that which is covered by the word sanitation. In this closing year of the nineteenth century we have come to such a full knowledge of the germ diseases that, whether in city, camp, or college, we are willing to comply with the rules of the boards of health even when they exact of us seeming infringements upon our old-time rights.

We must carry the same idea into the commercial greenhouse and orchard and the public garden. If we would have healthy plants the germs of disease must be kept out, or if once introduced they need to be speedily exterminated.

We admire perfect health in the robust and rosy youth; and the contrast between sickly plants and those in the full vigor of fruitage is entirely in favor of the latter. A short time ago I visited two chrysanthemum greenhouses only a mile apart; and one was filled with rusted plants without a fair-sized bloom or the possibility of one, while the other had not a sign of the rust and the plants and blooms were wonderfully fine. Purposely some days intervened between the visits that my skirts might be clean of the possible charge, upon my own conscience at least, of carrying the germs of the disease into the house where they were not before. The owner of the rusted stock introduced the infection in a few plants from a neighboring city and will destroy his present entire

stock, cleanse the houses even to the removal of his gravel paths, fumigate for the germs lodged in the crevices of the structure, and start again with stock that he is reasonably certain is free from rust. It may be that fewer precautions would suffice, but the ruin was so complete that humiliation has blossomed into heroic resolutions and no quarter will be given the rust-brown foe.

This is a case where no reasonable amount of attention might have averted the calamity. Possibly if the rust had been observed as it first came to sight, and the introduced plants destroyed, the result might have been different, but this is too much to ask of mortal gardeners. However, a plea is made for an observance of rules of sanitation with plants subject to contagious diseases, that is, in some measure, comparable with that demanded of the human subject and his domesticated animals.

Description of Plates of Asparagus Rust.

Plate I.

Fig. *a*. An asparagus stem showing Uredo form of the rust; natural size.

Fig. *b*. An asparagus stem showing Teleutospore form of the rust; natural size.

Fig. *c*. A portion of a section of an Æcidium cup showing the rows of spores and the Mycelium of the fungus and cells of the asparagus stem; magnified 175 times.

Fig. *d*. Æcidial spores; magnified 300 times.

Fig. *e*. Portion of Uredo sorus; magnified 25 times.

Fig. *f*. Portion of a section of a Uredo sorus; magnified 175 times.

Fig. *g*. Uredo spores; magnified 300 times.

Fig. *h*. Portion of teleutospore sorus; magnified 25 times.

Fig. *i*. Portion of a section of teleutospore sorus; magnified 175 times.

Fig. *j*. Two teleutospores; magnified 300 times.

Plate II.

Fig. *a*. A Uredo sorus infested by the Darluca; magnified 25 times.

Fig. *b*. A section of Uredo sorus infested by the Darluca; magnified 70 times.

Fig. *c*. Spores of the Darluca — three of them germinated; magnified 590 times.

Fig. *d*. A cluster of Æcidium cups infested by the Tuberculina— the cups are in the center and the Tuberculina marginal near the spermagonia; magnified 15 times.

Fig. *e*. Portion of a section of the Tuberculina; magnified 175 times.

Fig. *f*. Spores of the Tuberculina; magnified 590 times.

DISCUSSION.

Thomas Harrison asked whether there is any possibility of transmitting these rusts by mulching. He had lost more after covering than before. He had a small bed of Downer's Prolific strawberries which was much injured by rust, and asked if this could have been caused by the oak and other leaves used for covering.

Professor Halsted replied that the winter form of spore does not require any living plant, but in the case cited, or in the strawberry rust there would be no harm in covering with oak leaves or pine needles.

Samuel H. Warren said that the William Belt and Hunn strawberries are troubled with rust almost everywhere. The Clyde is a stronger variety, and is free from rust even when growing within two feet of those most badly affected. Most applications to prevent rust must be made before the rust shows.

Professor Halsted said that when the fungus is once within the tissue of blackberry and other plants, spraying is ineffectual. Strong, vigorous strawberry plants are less susceptible than weaker ones, and it is important to keep plants in good heart.

In answer to an inquiry he said that in a chrysanthemum house, where there were almost twenty-five varieties, only one was to any extent proof against rust. This was Inter Ocean, which was about half proof.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 20, 1900.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair. The following lecture was delivered:

A HALF-CENTURY'S EXPERIENCE WITH ORNAMENTAL TREE PLANTING.

By O. B. HADWEN, Worcester.

It is more than half a century since I purchased some land, the major portion of which was for many years used for pasture. It was not embellished with either tree or shrub excepting a few of Nature's planting, indigenous to the soil and climate, that had escaped the woodman's axe in the early clearing. Some were even three score years and ten, and accustomed landmarks. At that period but few thought of beautifying their homes or the landscape, or enhancing the value of landed property, either immediately or prospectively, with trees. With the progress of Arboriculture in embellishing grounds, either private or public, trees can be so arranged as to form a conspicuous and enduring feature, and planting be made to grace and adorn every situation.

Tree planting is a science and art nearly as old as the hills upon which trees of Nature's planting have grown for all time, and been nurtured with the natural conditions of climate and soil suited to the great variety indigenous to all sections.

But the art of tree planting by man seems to differ with each sort. So many conditions are involved relating to soil, climate, and exposure, that there will always remain something to be learned regarding the requirements of every sort. If we could look under ground and discover the conditions which each plant requires and which are necessary for its nourishment and growth, it would be a vast help to successful tree planting. If we could measure the wind and the extreme heat and cold of all exposures we could better determine what sorts to plant and where to plant them, before time and money are wasted.

But it seems to require a lifetime to discover the most favorable conditions, for each and every sort, as every tree, either deciduous or evergreen, seems to differ in the treatment most suitable for its habit, in its soil, exposure, space, pruning, and general treatment. Some trees refuse to grow near other kinds, and will lean from them. The exudations from the roots of some are apparently detrimental to the growth of others.

There is a natural, and at the same time a mysterious force which seems to govern the development of each tree or plant, and directs each tree to procure its sustenance by the inherent forces of both root and top, and these mysterious and natural forces seem to be the governing principle with each and every plant, all differing to a greater or less extent, as is apparent to the grower but cannot be explained.

The past fifty years have wrought a wonderful change in ornamental tree planting. The increasing taste has kept even pace with the increased variety, both of indigenous and exotic trees. Fifty years ago the value of tree planting to rural homes or ornamental scenery was but beginning to be understood, and the kinds used for ornamental planting were largely the Elm and the Maple.

The importance of trees to rural taste and comfort was almost entirely overlooked. Their influence upon climate and upon the landscape had not enlisted the time or the attention of citizens generally. The affirmation of their value in ornamental scenery, now so apparent, and sought for, has come by slow but sure advancement, and the selection of those which add so much by their stateliness, grandeur, and picturesque beauty and elegance: by gracefulness of form, both of branches and foliage, the brilliancy of the varied tints of autumn, and the beauty and fragrance of their flowers combined, have proved strong inducements to tree planting.

With the progress of arboreal planting and natural as well as cultivated taste in embellishing grounds, both public and private, trees termed ornamental can be made to form a conspicuous feature in the suburbs of towns and cities on farms and roadsides. Trees also exert a most decided influence upon the climate: they break the force of gales of wind; they tend to maintain an equability in the temperature, modifying the intensity of extreme

heat or cold. The variety at our command increases every season, and since the Arnold Arboretum was established trees and plants come to us from every country of the temperate zone.

But my farm is only a plain Massachusetts farm, where no attempt is made at the higher order of embellishment, but where more than a hundred different kinds of ornamental trees, and nearly if not quite a thousand individual trees have been planted to test their habits of growth and hardiness and improve the farm landscape. Some of them have already contributed to the construction of farm buildings, while others have been made into household furniture, and a plenty yet remain of ample size and dimensions, suitable for any purpose for which wood or lumber is used. These trees have been planted with my own hands, have been nurtured under my care and supervision, and some of them will outlive generations of men, and remain prominent landmarks as time goes on. The farm is about six hundred feet above tide water.

The better time to plant trees, either spring or autumn, is a question on which there is a wide difference of opinion. Having planted many trees at both seasons with good success, I have come to the conclusion that when climatic and other conditions which should be duly considered by the planter are favorable, the autumn is a propitious season for planting either deciduous or coniferous trees, provided it is accomplished early, when the ground is warm, and root growth is thereby encouraged. For planting deciduous trees, early in October is the better time. The foliage should be removed; the leaves will then cease to draw upon the roots for nourishment, leaving them in condition to make new growth, which they readily do when the ground is warm, and sufficiently moist. Both heat and moisture are essential to promote root growth at any season. In the spring, conditions are changed; the atmosphere is warm and the ground is cold, and while the leaves will start the roots remain dormant, and cannot promptly supply the nourishment required by the top.

Coniferous trees may be planted early in the month of September with advantage, provided the ground is kept moist to insure root growth. When these conditions can be carried out, autumn planting proves of decided advantage. If trees are to be transported long distances spring planting has some advantages. Even spring planting is facilitated by the holes being dug in the autumn; the

action of the frost upon the earth renders it more friable and more easily incorporated among the roots. Thoroughness in filling the spaces among the roots is of essential importance to successful tree planting.

The constantly increasing variety of Ornamental Trees that thrive in the central part of the state is so large that I can but briefly allude to even the most prominent — those that are approved by long experience, and those of newer sorts that promise well. Many trees that were considered but half hardy years ago have seemingly become acclimated, and now withstand our extremes of temperature, adding very much to the landscape in their variety and effect. Of the hardy sorts there are quite enough properly to embellish rural homes with a most agreeable and pleasing variety.

The Maples (*Acer*) have been for a long time and are now prominent in their variety and conspicuous both in landscape and streets — a favorite tree which well repays the attention it receives.

I have growing more than twenty sorts; most prominent are the Sugar, Norway, Schwedleri, Reitenbachi, Geneva, Wier's Cut Leaved, Sycamore, and Purple Leaved, Tataricum, Ginnale, Pennsylvanicum, Negundo, and the Japanese Maples and others which I will omit to mention. In fact the whole family is one of great beauty, and its members are in the front rank of deciduous trees; as ornamental trees some of them will fit any soil or situation. I have many large trees planted near the streets and roads which give abundance of shade and are the glory of the autumn.

The Magnolias are among the most magnificent trees for ornamental planting. Fifty years ago but few were considered hardy. The varied forms of the trees, with the size and verdure of their foliage and the beauty and fragrance of their flowers, place them in the front as ornamental trees where the soil and exposure prove favorable. I have some fifteen varieties, all proving hardy save one. They are *M. acuminata*, *M. glauca*, *M. macrophylla*, *M. tripetala*, *M. Alexandrina*, *M. conspicua*, *M. Kobus*, *M. Lennei*, *M. purpurea*, *M. parviflora*, *M. hypoleuca*, *M. Soulangiana*, *M. speciosa*, *M. stellata*, and *M. Thomsoniana*. Some of these trees are thirty feet high and their season of flowering

covers two months, and the foliage in its variety is fully as interesting as the flowers.

The Tulip tree is proving a great favorite on extensive grounds, and being of rapid growth soon becomes a stately tree. I have one less than forty years planted now over eighty feet high. The flowers, which are abundant and open in June, are of fine tulip shape, of greenish-yellow tint. The only objection is its liability to break in severe storms of ice, but with its rapid growth it soon recovers its form. Its lumber is known as whitewood, now so extensively used in inside finish. It is one of the noblest trees in good soil. It is a difficult tree to transplant unless quite small, but when once established and well nourished it well repays the care given to it. It should be transplanted in spring. Nurserymen have got into the way of growing tulip trees with planks underneath, so as to prevent them from sending down tap roots.

The Beech (*Fagus*) in its variety forms a class of ornamental trees worthy of more elaborate consideration than time will permit. The American Beech, found growing over our northern regions, is much esteemed for its neat and airy foliage which remains on the branches during the winter. When planted in groups with other beeches they give a pleasing variety, both summer and winter. There are no trees that withstand ice storms with less injury. The Fern-Leaved beech is perhaps the most shapely in its growth of any of the family. I have several, one of which is thirty feet high and thirty feet in spread and without question the most beautiful and symmetrical tree in my collection. The foliage is finely cut and very dense, making it a marked tree in any collection.

All the Birches are graceful trees; they have a graceful sweep and peculiar flutter in the breeze. Many are indigenous to New England, and thrive in northern latitudes. The most common are the Gray, Black, Yellow, Red, Purple, Canoe, and the Cut-Leaved Birches.

The Canoe birch attains the largest size. I have one forty feet high and two feet in diameter. The Cut-Leaved birches also attain large size and are perhaps the most beautiful of the family. They should not be planted near the house as they continue to shed both leaf and flower for a long time.

The Sweet Gum Tree, (*Liquidambar styraciflua*) now being

considerably planted, is not, so far as I can learn, indigenous to the New England States but seems to thrive here where the situation is favorable. In the Southern and some of the Western States it grows to a large size. My trees of this variety are twenty feet in height, finely formed and of shapely growth. As an ornamental tree it has few equals, the exquisite gloss of the foliage in the summer, changing with varying autumn tints to a beautiful bronze, and the exquisite form of the leaves, combine to give it a distinctive character and to render it an ornamental tree of the first class.

The *Virgilia lutea* or Yellow-Wood ranks among the finest of ornamental trees, with graceful foliage and clusters or racemes of white flowers in June. It forms a shapely head and grows freely in good ground. It is especially adapted to moderate sized grounds where but few trees are grown, but it is an admirable tree in any collection.

Many species of the Oak (*Quercus*) are indigenous. I have some of Nature's planting four feet in diameter and sixty feet spread of limbs. They too rarely adorn private grounds, being difficult to transplant. When planted they should be young and pruned to the pole. When the Oak is given ample space to develop and time to mature, but few trees can be compared to it in its variety of beauty changing with the seasons from the delicate form and color of the opening leaf, to the deep and glossy green of the summer and the gorgeous colored tints of the autumn.

The Walnut (*Juglans*) is readily grown from seed and transplanted when young, or when large with a frozen ball of earth. There are several sorts that are desirable both as nut and ornamental trees.

The Black Walnut makes a fine vigorous tree; tall, with a spreading habit; its leaves are long, swaying gracefully in the breeze. The black walnut from Japan seems very much like ours both in leaf and fruit: there is one from Japan producing fruit in clusters.

The Hickory (*Carya*) makes a stately tree and is long-lived, bearing nuts which are esteemed. The Shellbark with its luxuriant leaves and shaggy bark has a distinct habit differing from other trees. Its fruit is abundant, of delicate flavor and prominent in the markets.

The American Linden or Bass (*Tilia Americana*) is coming to be esteemed a popular ornamental tree, by far superior to the European sorts. It surpasses all others in size and foliage and the abundance of its flowers, whose fragrance fills the atmosphere. I have some more than eighty feet in height, and very stately trees.

There are many other deciduous trees growing on my farm, well worthy of planting, which I can only attempt to designate by name. Among these are the Mountain Ash, Oak-Leaved Ash, *Catalpa speciosa*, Double Flowering Horse Chestnut, Kentucky Coffee tree, Ginkgo, Koelreuteria, *Aralia spinosa*, Cercidiphyllum, Tupelo; Poplars — Bolleana, Carolina, and Lombardy; *Sophora Japonica*, Sassafras, *Syringa Japonica;* Elms — American, English, and Scotch; and the Nettle tree (*Celtis*).

Coniferous trees, for their symmetry of form and varying shades of everlasting green, and the beauty and grandeur of individual trees are enlisting increasing attention. My first planting of the White Pine (*Pinus Strobus*) was in 1846. They were planted more with the purpose of shelter than for ornamental effect, and for the first thirty years they furnished both, but in later years they have been much broken by storms and ice, and now, while they would furnish good saw logs, they are not very ornamental. I early planted the Scotch and Austrian pines and both proved inferior to the white pine. The Swiss pine (*Pinus Cembra*) proves the best of the pines, retaining its symmetry of form and its beautiful shade of green. It is well furnished with branches, which are of tougher fibre than others, and resist the storms of ice.

The Norway Spruce, now so well known, was a favorite tree. I planted them quite extensively and they have attained a height of from sixty to eighty feet and are prominent in the landscape. They form a splendid pyramidal head and the branches are flexible and remain unbroken even in old age.

The Silver Fir has proved a rapid grower after the first few years; the foliage is conspicuous with its shiny green and silver lines. It attains a height of sixty feet.

The Oriental Spruce is a charming tree, differing from the other spruces in its compact form and short, dark, and attractive foliage.

The Hemlock Spruce, indigenous to the New England States, is perhaps the best of the coniferous trees. I have some planted thirty-five years, which now are fifty feet high. When standing alone it forms a shapely and graceful tree; the marked and distinct contrast in color of the new and old foliage is always pleasing, and when it is covered with light snow it forms an object of beauty unequalled in winter scenery. It withstands the storms of ice, for its branches are so flexible they rarely break. For this climate it may be justly called the queen of the evergreens.

The White Spruce is the most shapely of the spruces, with its light green leaf, sometimes shading to blue. Its compact form and slow growth render it adapted to small areas where primness is desired.

The *Picea pungens*, a Colorado blue spruce (sometimes green), is proving an attractive and desirable sort. I have some thirty feet high and they form fine pyramidal trees, many with a bluish silver sheen. The foliage is stiff and strong and they seem especially adapted to high altitudes, and withstand the force of the winds uninjured.

The *Abies concolor* is proving one of the most attractive evergreens, being of fine symmetry. The foliage is very long, with a silvery sheen. They thrive in the higher grounds, and should be transplanted when small, or with a ball adhering to the roots. I will only designate by name the other conifers that I have growing on my premises.

Abies Veitchii from Japan makes a beautiful tree; *A. Douglasii*, *Picea Alcoquiana* from Japan; *Picea Engelmanni*, *P. Nordmanniana*, *P. Omorika*, and *P. Fraseri* are the most prominent. Then there are Arbor Vitæs and Junipers, of both of which there are a number of desirable and pleasing sorts from China and Japan, and new ones grown from seeds are adding to the number every year.

The increasing importance to residential grounds, of evergreen trees combining both shade and shelter is manifest every season. The comparatively new varieties also are adding interest every season to the charm of homesteads and landscapes.

The earlier tree planting was not pursued so much with a view to landscape effect as to give shelter to buildings and orchards and fields with northerly slopes, from fierce winds. Those indigenous were commonly used; exotics were few and looked upon with

doubtful forebodings and were regarded as more experimental than practical. But time has changed tree planting; with later years exotics are sought for the variety and novelty they furnish, together with the pleasing effect of both trees and leaves. A tree must break the force of the wind, must drink of the dew and the moisture of the earth, must eat of the food that will nourish and strengthen its fibre, and lives and grows in accordance with,—is it instinct or knowledge? I know not.

In tree planting no one rule can be applied to all kinds, but general rules are essential to success. In early life I made many mistakes; then I had not learned the importance of digging generous holes, deep in well drained land, and shallow in wet places. I have learned to use an adequate supply of well composted material about the roots, and also have learned that an annual dressing should be applied to produce the finest effect both in tree and leaf, as years roll on. The marvelous instincts of tree roots, where they run long distances in quest of food and moisture, are unexplainable; what forces direct them is far beyond my comprehension. I often see in the roots conditions I am powerless to explain. Roots seem to seek their food and drink with the same knowledge that man and animals seek them, and when a tree suffers from want either of food or drink, the roots will make the most strenuous exertions to sustain the trunk and foliage. By what power do trees select, each its distinct form, each its distinct leaf, which is endowed with distinct shades of color, which with their marvelous tints and unnumbered forms must ever remain surprising to all lovers of trees, Nature's most wondrous plants.

But we now enjoy greater advantages in tree planting than ever before in our time. There are gentlemen within this Commonwealth and members of this Society, who have devoted long lives to the embellishment of fine estates, and have planted them with every variety of deciduous and evergreen trees which will thrive here. These trees receive every care to promote symmetry of form and perfection that science and art and common sense can contribute.

Many of these finely embellished estates are open to lovers of trees and are veritable object lessons in an arboreal or horticultural sense, diffusing arboreal knowledge to the present and coming generations and the owners are justly esteemed great public benefactors.

DISCUSSION.

Ex-President William C. Strong said he had been much interested in the lecture, as had all who heard it, and spoke of the Ailanthus, which the lecturer had omitted to mention. He was very much surprised and delighted with a group of *Ailanthus glandulosa* planted on the slope of Wissahickon Heights, at Philadelphia. The trees were loaded with large clusters of fruit. The disagreeable odor when in blossom early in the season has made this tree objectionable. It used to be common in Brooklyn. The lecturer, he said, had spoken of the maple as one of the first, as an ornamental tree. It is the first when we consider all the species. The speaker wished to protest against the universal use of the Rock Maple. He considered it too formal and as making too dense a shade for the street. Schwedler's maple, first imported by him some time in the seventies, he thought a very ornamental tree. He imported it as a pot plant and was so delighted with it that he repeated his order for a pot plant at five dollars. He recommended the Wier's Cut-Leaved Weeping maple although it is slender and likely to be broken by ice. It is a light airy tree and very graceful. It ranks with the elm, and he considers it very desirable for street planting.

Jacob W. Manning had known Mr. Wier, who introduced this tree. The finest specimens that he had ever seen are at Arlington Heights. The call for oaks to plant in parks, the speaker said, is increasing. He thought he had done more than anyone else to make the White Spruce popular. It retains its lower limbs and he thinks it one of the best of evergreens. He had seen the Blue Rocky Mountain Spruce in the Platte Valley five feet in diameter and fifty feet in spread, and with cones five inches long. Only a small part of the trees are blue.

Mr. Manning spoke of the fall of the Batchelder pine in North Reading, in December, 1899. It was dead excepting one limb which rose to the height of one hundred and twelve feet. The diameter of the log at the butt was ten feet, but there was three feet of rotten wood inside. At fifty feet high it was nine feet in circumference. It was probably two hundred years old. He first saw it fifty-two years ago. It was broken by ice in 1886.

Ex-President William H. Spooner wanted to caution people

against planting the elm. He had suffered all kinds of torments from some on his street. He had found his drain filled solid with their roots. He spoke of the terrible methods of the electric companies, who come along and saw off limbs with no regard for the effect on the beauty of the tree. The City Forester, he said, takes no pains to protect the trees. He asked Mr. Hadwen for a little information as to the best tree to plant on the seashore,—something tough enough to stand our winds. Beyond Tremont on Cape Cod the White pine is not hardy; the Scotch and Austrian pines do better.

Mr. Hadwen said that in Nantucket they plant the Yellow pine. He favors planting street trees inside of premises; the owners can then control them. He has planted many trees in the streets of Worcester and has come to the conclusion that it is not best to plant in the business portion of the city. If sidewalks were ten feet wide it might do to plant on the edge of the sidewalk.

Benjamin P. Ware spoke of the modesty of the lecturer, who had called his farm a plain Massachusetts farm where no attempt had been made at adornment, yet he did not know of any private grounds more beautifully ornamented.

Mr. Ware had planted many trees and found the Sycamore Leaved maple very desirable. The Norway maple also is desirable but care should be taken in pruning as it is likely to split. He has the Norway pine growing very successfully directly on the seashore. He finds the Red cedars indigenous there, and has been interested in watching the different forms taken by them,—some straggling, and some as upright as Lombardy Poplars. Mr. Ware said that the elm had always been considered a pretty good tree, and wondered what they would say in New Haven if they were to hear it condemned. He recalled Lafayette Street in Salem with its magnificent elms on either side meeting overhead, the branches so high that the electric wires are underneath. He spoke of a magnificent White oak on the Treadwell Farm in Topsfield, with from one hundred and twenty-five to one hundred and fifty feet spread. If it had not been for the demand for ship timber there would be many more now standing in Essex County. He wished to emphasize the enjoyment and delight of tree planting.

President Appleton spoke of a very exposed lot of land at Gloucester, owned by T. Jefferson Coolidge, who had had it laid

out and planted with Scotch pines. They had grown wonderfully well and as houses took the place of the trees they were well protected.

Leverett M. Chase said he was greatly interested in the subject before the Society. In walking two hundred and six miles from Liverpool to London he had been struck with the beautiful trees, especially the great oaks on the college grounds. He commended Evelyn's Silva, in which we find an account of the beautiful forests of England. The planting of oaks, he said, was the foundation of the naval power of England. Mr. Chase told how John M. Way of Roxbury had prosecuted line men for injuries to his trees and received damages. The same man had prosecuted a physician whose horse had injured his trees. In answer to a question by Mr. Spooner, Mr. Chase said he was not sure that the law as to trees being injured by electric companies is still in existence.

Rev. Calvin Terry thought no special law was required. Trees are private property, and persons injuring them are liable. Roots will go a long distance seeking food. They will steer for food and water and find them. There is a divinity in their instinct. He likes the sugar maple.

Mr. Chase said that he admires the elm; there is nothing more beautiful than a perfect elm. He spoke of the Whittemore elm in Arlington, said to have been set out by Samuel Whittemore in 1724. Fifty-one years later, when eighty years old, he took part in the Battle of Lexington, and was left for dead by the wayside, but he recovered and lived to sit in the shade of this elm till the age of one hundred and one.

The President called attention to a statement by Dr. Schenk, who is at the head of the Biltmore School of Forestry and an expert in forestry matters, in "The Capitalist and Economic Forestry," that in Europe investments in forests are considered safer than investments in government bonds.

James H. Bowditch invited all who are interested in the subject to attend the first lecture to be given under the auspices of the Massachusetts Forestry Association, on Thursday evening, January 25, in Horticultural Hall, on "Forests and Roadsides in Massachusetts."

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, JANUARY 27, 1900.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair. The following illustrated lecture was delivered:

THE PROCESSION OF FLOWERS IN PENNSYLVANIA.

By Miss MIRA LLOYD DOCK, Harrisburg, Pa.

Prologue, without slides.

The title is adapted from Helen Hunt's "Procession of Flowers in Colorado," one of the most sympathetic sketches of the varied plant life in the home of her adoption. Her vivid sketches have left their impress in all portions of Colorado, where her flowers and her words are held in such loving remembrance that even the little pressed specimens acquire an interest from the quotations accompanying them. Mrs. Jackson's title was adapted, with his consent, from Colonel Higginson's "The Procession of the Flowers."

With few exceptions, the subjects chosen for illustration have been gathered in several very small areas, all lying within a radius of one hundred miles, and ranging from tidewater to an altitude of one thousand feet. About one-third are from the immediate vicinity of Harrisburg, on clay and limestone soils, and also from rich woodlands on the mountains near; a few are from shaly soil, but the most interesting ones are from two very rich botanical hunting grounds, one on the Lower Susquehanna, the other in the South Mountain, both on sandstone and quartz rocks, and both about fifty miles from Harrisburg.

The species selected have been somewhat restricted to those that are purely American or Asiatic-American in distribution. The arrangement has been based upon Asa Gray's writings on "The Flora of Japan," "The Flora of North America," and "Forest Geography and Archaeology." This arrangement would be of value in rural school gardens where the monotypic forms of

America, (such as Medeola and Sanguinaria,) could be planted together, associating the species represented in both hemispheres, a juxtaposition which must be interesting to true plant lovers. Even this small study of distribution would be of great value in showing the habit of our native plants, their method of growth and dispersion of seeds, in comparison with many of the introduced plants that we know as weeds, which latter often gain a tremendous ascendancy through the favorable conditions we provide for them, in removing the shrubbery and trees which sheltered our own less aggressive species.

Botanical nomenclature is the path along which many plant lovers have fallen by the wayside, dismayed and discouraged by the scientific names, which are frankly a hopeless impossibility to those who try to know names, without really knowing plants. For some inexplicable reason it is considered rather clever to rejoice in a large-hearted ignorance on the subject of botanical terminology, and this by the very persons who would be wretched if they were supposed incapable of talking on literary, musical, or art topics in technical terms. No one ever refers to a canary bird or parrot as a "biped," or to a collie or terrier as a "quadruped," yet really delightful, travelled persons will all the days of their lives speak of a familiar species of tree as "that tree!" Nothing is easier than to know the trees of one's own home, if one remembers John Burrough's advice and "takes his plants slowly," one at a time.

Nowadays, the many charming books on plant topics make it an easy matter to have at least a speaking acquaintance with one's outdoor neighbors.

Quite apart from the common meeting-ground that botanical terms afford to those speaking different languages, very much of human interest and history is contained in the old tomes that throw light on this subject. In some names we have terms that reach back to the twilight of history, as in Lily and in Lilac, both derived from the same Aryan root, which means "a flower."

How many explorations and discoveries are celebrated, as in the Claytonia Virginica and the Cercis Canadensis! How many friendships are commemorated, as in Magnolia, Kalmia, Mitchella, and Gaultheria! The names of our own common plants date back to those times in the seventeenth and eighteenth centuries when

new and unknown plants by hundreds were being sent by the Jesuit Fathers, from Canada to Tournefort in Paris; from Bannister, Clayton, and Mitchell in Virginia, to Ray and Dillenius at Oxford, and to Gronovius at Leyden; from Alexander Garden at Charleston to Ellis in London; from Cadwallader Colden at New York to Linnæus at Upsala; and from John Bartram in Philadelphia to all these centres of learning, but more especially to Peter Collinson of London, whose garden at Mill Hill, and Bartram's own garden at Kingsessing, were the points of departure for plants of both countries. In Bartram's garden, still happily preserved to us as one of the parks of Philadelphia, were planted the first China Asters, Oriental Poppies, Gladiolus, Norway Maples and Horse Chestnuts, noted in Colonial literature. In Collinson's grounds were planted the first Hepaticas, Cypripediums, Azaleas, Trilliums, Orchids, Kalmias, and Rhododendrons known in England.

The procession begins with the period of work, preparation, and rest, which, as in all processions, precedes the great massing of forces and unfurling of banners. It endeavors to show plants at home, their special friends, allies, and neighbors; their natural growth, and their change of habit due to change of environment. We study them comparatively, as we do other subjects, and as a picture reminds us of the school or period to which it belongs, so a plant may suggest to us its home ties, its far-off tropical, Alpine, or antipodal relations, the extinct members of its race, the great part that members of its family have played in the human drama. Thus we learn to think of our plant not as a mere rose or geranium, but as one of the links of the great world-chain.

The Procession.

In late autumn the procession is waiting orders. Banners are furled, buds folded close, and when the leaf curtain falls there is opportunity to see the massive boles and boughs of Chestnut and Oak, the tracery of weeds upon the snow, of the delicate articulation of Elm and Birch against the sky. Pushing aside the snow the Mayflower is ready to unfold, and in sheltered nooks Hepaticas and Dandelions open to the touch of the south wind. These are only marshals prancing up and down the line to announce that all

is ready; the true procession begins with the plant police, the Skunk Cabbages, who in March lead the way with helmet and club. Then the White Maple unfurls the first tree banner, followed closely by the Red Maple, whose crimson buds are an old story to us, but two hundred years ago were the pride of Bishop Compton, when his new American Maple opened its strange red blossoms in Fulham Garden. Then follows the Pussy Willow, a signal to look for the Mayflower in early April, one of the plants not known in Europe. With it and following after are Hepatica and Bloodroot, the latter growing only in Eastern America; the Hepatica with cousins in Europe but not clad in chinchilla, as Helen Hunt calls its protective fur. Both of these were named at Oxford about 1735 by Dr. Dillenius, in the Botanic Garden across from Magdalen College.

The Frog and Bird bands have long begun their music, and when the glens show the golden mist of Spice Bush, and the white tassels of Service Berry, the first great battalion of spring flowers reaches from curb to curb.

Spring Beauty was sent by its finder, John Clayton, from Virginia to Dr. Gronovius, at Leyden, who named it after the sender, and it has a still closer association for us when we think of that young medical student in 1828, taking it home in a New-York village and analyzing the first of thousands of blossoms to pass through the hands of Asa Gray. The forest floor is carpeted now with Toothwort, Saxifrage, Dogtooth Violet and the great Chickweed called after Michaux; with Anemones and the beautiful lustrous leaves of the Wild Ginger, blue Gill-over-the-Ground, and pink Lamium in attendance.

When Wild Cherry powders woodlands and fields, and the sun filters through the delicate green of Birch catkins in late April, we look for the most beautiful of our spring blossoms, the great White Trillium, known these two centuries in English gardens as the American Wood Lily. It reaches its fulness of bloom when Anemones are at their height; and surely a hillside starred with these is worthy of protection!

All this time Fern Croziers are uncoiling; on the stipes of the Cinnamon Fern we see the down gathered for their nests by Humming Birds. Follow the croziers down to the massive rhizomes of the Osmundas that hold and buttress swampy soil or hill-

side; see the root-tips of Rock Polypody as they slowly wear away the rock to form soil! See the folded buds of next year's fronds, the fronds that are to follow them even now blocked out, and consider the destruction of beauty when thousands of these are rudely plucked from their anchorage!

When woodland borders and roadsides are flushed with the pink of Redbud blossoms in early May, the second spring battalion has arrived. On rocky banks Wild Pink makes a brave show, Mitella holds its spears upright, on dry banks the Bird-foot Violet is set in gray Reindeer Moss; in dry grass are the invisible spears of Blue-eyed Grass, the orange plumes of Puccoon, and everywhere sweet Quaker Ladies. In rich woods lavender Phlox and dark Trillium mark time for the showy Orchis to rise from its green sheaths. The flaming leaf sheaths of young Hickories unfold, and woods are starred with red-berried Elder, Viburnums, and Dogwoods. (See the admirable suggestions made by Professor Shaler as to Roadside Parks, in his "American Highways").

As Mitella fades, Columbine nods from the same cliffs, and sometimes on the cold damp side of these we find great masses of Meadia, the American Cowslip of English gardens. With these the pink Azalea with its color and grace, and Wild Crab with its loveliness and perfume challenge the new stars of the woods, the Moccasin Flowers. These were among the earliest foreign Orchids introduced into England, and whether the glorious *Cypripedium spectabile* with white lips tinged with pink, or the yellow *pubescens* was first, we do not know, but the pink *acaule* was sent by John Bartram to Collinson, bloomed in 1738, and was figured from that plant by Catesby. (The *pubescens* attains great age, one plant shown having the scars of twenty-seven years,—first bloomed during the Franco-Prussian War. Gerard figured the English species three hundred years ago).

With these aristocrats of the plant world, the humbler Jack-in-the-Pulpit and Solomon's Seals are marching along, and the curious dark cinnamon blossoms of the Papaw are stiffly set on their angular stems. When May-Apples bloom, the high-water mark of spring is reached, and late in May the drooping white racemes of Locust mark the approach of summer. A true plant shrine is that corner of the Jardin des Plantes in Paris, where the first locust ever seen in the Old World bravely holds its own,

though planted in 1636. Following the Locust are the green and orange cups of the Tulip Tree, the Virginia Lily Tree of early explorers.

Then comes the great glory of our Appalachian hillsides, the Kalmia or Mountain Laurel, found nowhere in the world but in Eastern North America. In his garden at Upsala we can fancy Linnæus watching the growth of the American plants brought by his returned student, Peter Kalm, and listening to the tales of the vast thickets of the shrub he named after his student. While Laurel crowns the hills Pentstemons are nodding on banks, and everywhere Roses shedding their petals, reminding us that spring has passed:

"Alas that Spring should vanish with the Rose!"

Other plants of that race appear throughout the summer, but except the Swamp Rose, they are not true roses of bank and field.

Summer brings the Sweet Bay, the plant of long coastal range, ancient history and many memories of Raleigh's Virginia expedition, of Cotton Mather, and of the French Botanist Magnol, after whom it is named. The fragrant white Azalea of Craddock's pages is passing now, and swampy meadows are tinted with the pale pink of Pogonia, the deeper pink of Calopogon, and the stately spikes of purple and white Habenarias. Our American Calopogon was the first Orchid figured in Curtis' Botanical Magazine (in 1790) and no plant will better repay microscopic study.

When Catalpas bloom and Chestnut tassels powder the woods with gold, the "Midsummer pomps" of Arnold have come, and the Appalachian Woods are in full panoply, marshalling their stateliest flower, the great Rhododendron. It ranges from Berkshire to Georgia, has relatives on the Alps, the Pacific coast, Eastern Asia and the Himalayas, but the Mountain Rhododendron belongs to Pennsylvania by priority of discovery and description.

In 1734 John Bartram made a journey up the Schuylkill beyond the Blue Mountains, and at some point near where Reading now stands found a plant whose seeds he sent to Collinson, packet No. 102, with a description that must have been somewhat enthusiastic, for ever after Collinson spoke of it as "that Noble Laurel thee discovered beyond the Blue Mountains," and said "this

seems to be the most elegant tree discovered in your province." For several years hopes and fears rose and fell over specimens of this plant sent to Collinson and Lord Petre. For several years there was only wonder and admiration for the "noble Laurel" that grew, but would not bloom, and until it bloomed the botanists could not name it, so from descriptions of its rose-colored flowers it was called the "Rock-rose of Pennsylvania." In 1739 Mr. Hamilton sent over blossoms of the plant, which enabled the botanists to classify it, as the *Rhododendron maximum* (the Great Rose-tree). Prior to this discovery the low Alpine forms had the prefix "chamae" (Ground Rose-tree) attached. Within the next two years the Pontic and Siberian Rhododendrons were received by Collinson, but not until after the *maximum* was well known to collectors of that period.* Hosts of lovely small blooms carpet the ground—Wintergreen, Veronica, Hop Clovers—but in July the meadow flowers draw us to feathery plumes of Meadow Rue, the golden disks of Rudbeckia, and the splendid bells of Turk's Cap Lily, close cousin of the "Lily of the Field" of Palestine. A fascinating study can be made of their habit of inflorescence, the pendulous buds responsive to but not disturbed by every breeze; the slow movement of the peduncle as the flower expands; the gradual upward movement of the pistil, until within ten days from the opening of the flower the capsule has passed through more than one hundred and eighty degrees, and placed itself in a position of safety, its now rigid peduncle turned slightly in towards the stem.

In sultry August the deep rose of the Swamp Mallow enriches every swamp where it blooms, and pink is everywhere rampant, from the Milkweed along streams to the damp fields where great tufts of Joe-Pye Weed hold sway, and thickets lovely with Meadow Sweet are reached through beds where Deer Grass opens its curious stamens, and pink Gerardia bells hang for a day, all these intermixed with the ivory balls of Button Bush, this plant having the odd distinction of being the last plant noted by Humboldt and Bonpland, as they embarked at Wilmington for France in 1814.

While all these swamp friends are hastening by, in dry fence corners we find White Spurge, insignificant cousin of the splendid

* Address on Bi-centennial of John Bartram's birth, before Pennsylvania Historical Society, Philadelphia, March 23, 1899.

Poinsettia, in Oak woods the delicate fringed bells of starry Campion nodding above ghastly Indian Pipes, the still whiter Amanita, and in odd nooks the ecru and tan Chantarelle lifts its trumpet; and with all of these, the loveliest of the Figworts, yellow Gerardia, named after our old friend the Herbalist, whose portrait painted three hundred years ago, shows him proudly holding a sprig of the latest floral novelty, the American Potato!

Just as the procession seems to have reached a sameness of sound and color, there come in August new and stirring notes, the splendid blues and scarlets of Lobelias, the purple and gold of the great army of Compositæ, the scarlet spikes of the Cardinal Flower heralding the beginning of the end.

"Hail and farewell, prince, prelate of the August wilderness,
That in the dell hearest a mass said for the soul of summer by the birds."
(GRISWOLD DICHTER, "A Floral Calendar.")

Enter Autumn with forces thickly massed; the white of Wood Asters, the lavender of Swamp Asters, the deep purple of the New England Asters in fields, great clumps of white Boneset close to the rose-purple Vernonia—an enchanting combination of color—and high above all the pale gold of giant Sunflowers, while Golden-rod has marched with all of these and earlier blooms. In September we find the Turtle-head and the Closed Gentian with its metallic lustre shining by blanched Dicksonias. The trees now monopolize crimson and gold, as the Fringed Gentian opens its eyes; and as leaves crisp, the belated golden filaments of Witch Hazel stream forth.

Then the noiseless feathered seeds of Clematis and Milkweed flutter through the air, the color fades from Maple and Oak. Now comes the stillness of the "beautiful Summer of All Saints," then the "volleying rain;" the leaf falls, the procession has passed!

BUSINESS MEETING.

SATURDAY, February 3, 1900.

An adjourned meeting of the Society was holden today at eleven o'clock, the President in the chair.

Charles E. Richardson read his Annual Report as Treasurer, which had been approved by the Finance Committee. The report was accepted and referred to the Committee on Publication.

The President reported to the Society the disposition, stated in the following letter from the President of Harvard University, made by the Corporation, of the Stickney Fund, which was held by this Society for thirty years, and, agreeably to the terms of the indenture between the Society and Mr. Stickney, was paid over to Harvard University on the first day of February, 1899.

HARVARD UNIVERSITY,

CAMBRIDGE, January 9, 1900.

DEAR MR. APPLETON:

I wish to report to you at once that the Josiah Stickney Fund of $12,000, which was for thirty years in the keeping of the Massachusetts Horticultural Society, was yesterday assigned by the Corporation to the support of a course to be given at the Lawrence Scientific School of Landscape Architecture. Mr. Frederick L. Olmsted, Jr., is to be the Lecturer, and he will have an assistant, Mr. Shurtleff of the Olmsted office. Of course only the income of the Stickney Fund will be used. I am sure you will find this application of the fund highly appropriate.

Very truly yours,

CHARLES W. ELIOT.

GENERAL FRANCIS H. APPLETON.

The following named persons, having been recommended by the Executive Committee as members of the Society, were on ballot duly elected:

ROBERT MELROSE GRAY, of North Easton.
FRANCIS L. HIGGINSON, of Boston.
THOMAS HOWDEN, of Whitinsville.
JOSHUA LAWSON, of Brookline.
JOHN C. PHILLIPS, of North Beverly.
PETER B. ROBB, of Whitinsville.
MISS MARY RODMAN, of Concord.
LAWRENCE TUCKER, of Boston.

Adjourned to Saturday, March 3.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 10, 1900.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair. The following illustrated lecture was delivered:

GARDENS, FIELDS, AND WILDS OF THE HAWAIIAN ISLANDS.

By JOHN K. M. L. FARQUHAR, Boston.

The trans-Pacific tourist who spends only a few hours at Honolulu, while a steamer is discharging and receiving passengers and cargo, can get little idea of the fertility of the Hawaiian Islands. Approaching Honolulu one sees the blue outlines of extinct volcanoes, and, drawing nearer, the sun reveals barren mountains of crumbling lava, with occasional patches or fissures of vegetation. It is not until one actually travels among these volcanic masses that any conception of the marvellous fertility of the valleys which intersect them is had.

Formerly many of these mountains were covered with timber, chiefly sandalwood, the sale of which formed a source of revenue

to the kings of the islands until it became exhausted. The Bureau of Agriculture is now making efforts to replant them. Certain varieties of eucalyptus and acacia have been found most successful. The Algaroba, which was introduced about thirty years ago, is of great value for planting on arid lands, and on Oahu we find more of this tree than of all others combined. Its delicate pinnate foliage is always green, and in periods of extreme drought furnishes excellent fodder for cattle and horses, while its sweet seed-pods, which resemble wax-podded string beans, and have the flavor of St. John's bread, may be ground, and the flour made into wholesome bread for man.

The best shade tree in the vicinity of Honolulu is the monkey-pod, *Albizzia bicolor*; a tree of very dense and spreading habit and bearing beautiful purplish lilac flowers, which remind one of giant Sweet Sultans. The tamarind thrives here, attaining a greater height than the monkey-pod, and although the foliage is much finer, it is dense and gives ample shade. Splendid specimens of banyan are also met with, one of the best being in the grounds of the late Princes Kaiulani, and nearly overgrowing her beautiful residence.

There are several trees bearing remarkably showy flowers; among them *Cœsalpinia regia* becomes when in bloom a mass of flaming scarlet; *Cœsalpinia sepiaria* bears large deep yellow blossoms, and *Cassia fistula*, commonly called Golden Shower, bears enormous golden yellow flower clusters. The seed pods of these trees are usualy from fifteen to eighteen inches in length.

The Royal palm, *Oreodoxa regia*, is employed to line avenues. It grows about two-thirds as high as the cocoa nut, the trunk being perfectly perpendicular, while that of the cocoa nut is always bent. The Date palm is similarly used and affords more shade; an objection to it is the fact that the fruit when ripe drops freely and litters the roadways. A tree photographed near Honolulu had eight clusters of fruit, each of which would have filled a half a bushel measure or more. The dates are of fair quality, but as the climate suits them, the finest sorts should be introduced.

Caryota urens known as the Wine or Fish-tail palm is extensively employed for landscape decoration. The specimens seen are usually about thirty feet in height, generally bearing two or more bunches of fruit. The erect, bipinnate leaves of this palm

are of light and graceful appearance, and form a pleasing contrast with the heavier foliage of other tall sorts. More than one hundred and fifty varieties of palms are now grown on the islands.

The little Otaheite orange, which is now seen here in pots in florists' windows attains in Oahu a height of forty feet and bears abundantly. Notwithstanding the fact that citrus fruits luxuriate on the islands, more than five thousand dollars worth of lemons and oranges are annually imported from California. Delicious figs, much superior to those sold in California, are sold by native children on the roadsides at five cents a dozen. Bananas may be grown on all the islands. In the vicinity of Hilo they do particularly well, and there irrigation is unnecessary. Unfortunately the varieties grown are not the best for market or export. The magnificent yellow bananas which are brought to Boston from Golden Vale and other plantations in Jamaica are much superior. The best Jamaica variety of *Musa sapientum* should replace the small *M. Cavendishii*, now grown. The islands would then be able to supply cities west of Chicago with such fruit as is received on the east coast from the West Indies, the distance by sea being about the same.

Cocoa nuts may be grown on any of the islands near the coast; they receive little attention however. The only extensive grove seen was near Waikiki in Oahu.

Guavas grow wild in all the islands, from the sea level to an altitude of about three thousand feet. They are chiefly useful for preserves. The ground cherry is found in abundance within the same limits, and at about two thousand feet a red raspberry (*Rubus Hawaiiensis*), of rather insipid flavor, bears profusely. Strawberries and raspberries have been introduced and yield fruit the year around at from two thousand to three thousand feet elevation.

The Papaw (*Carica Papaya*) is a very singular fruit, borne on a tree somewhat resembling the castor-oil plant. The fruit is very rich in sugar and is used to feed chickens and pigs. It contains a milky juice which has the property of rendering tough meat or fish quite tender. Sometimes a piece of the fruit is boiled with tough chickens, making them tender and easily digested. Fresh meats and fish are similarly improved by being wrapped in the leaves of the papaw for a few hours, and the natives make this a

practice. The leaves of *Dracæna lutea*, which is indigenous, take the place of wrapping paper in the markets. In broiling fish the natives invariably place it between two of these leaves for the pleasant flavor which they impart. Formerly the natives made a distilled liquor from the roots of this Dracæna; of recent years its manufacture has been prohibited by law and the natives who were addicted to its use now take gin instead, with which it was almost identical in flavor and appearance.

The success of the sugar planter has been detrimental to the development of other lines of agricultural industry. One finds on the islands, century plants with leaves from eight to ten feet in height, yet the Sisal plant, which is a variety of the century plant, is not grown. Cocoa, olives, mangos, limes, lemons, oranges, figs, and finer grapes should become profitable crops for mountain slopes and other lands not adapted to sugar cultivation. Progress in this direction can hardly be made, however, until better varieties of these fruits shall have been introduced. Most of the improved sorts needed could be obtained in Jamaica. When it is learned, however, that the sugar plantations have yielded as high as sixty tons of cane per acre, giving when crushed twelve tons of sugar, or more than double the average crop on the West Indies, and making possible annual dividends of from fifty to seventy-five per cent, it is not surprising that other branches of agriculture have been overlooked.

The most productive sugar plantations of Oahu are reclaimed arid lands composed chiefly of pulverized lava, which were more or less occupied with *Opuntia truncatum*. Dense masses of this cactus are to be met with, each mass extending over several acres and attaining a height of from twelve to eighteen feet. The Opuntias on the dry lands and the tree ferns in the moist regions have been valuable agents in the formation of loam deposits.

On the beaches of Oahu, the loose sands are frequently covered with the ivy like foliage and brilliant rosy red blossoms of *Ipomœa Turpethum*; a little farther back may be seen *Argemone grandiflora*, *Ipomœa Batatas* and *I. insularis*, the last having beautiful light blue flowers of large size.

Lantana hybrida and *Acacia Arabica* have become troublesome, weedy shrubs. Hundreds of acres are invested with these pests;

the vast crater of the extinct volcano, Punch Bowl, overlooking Honolulu, is completely overrun by them.

Many beautiful wild shrubs are to be seen on the mountain slopes or in protected valleys, among which may be mentioned *Sesbania tomentosa*, *Gossypium tomentosum*, *Hisbiscus Arnottianus*, *H. tiliaceus* and *H. Youngianus*.

An enterprising Greek fruit dealer named Camarinus introduced the Smooth Cayenne pineapple, intending to grow it for export. He sold his first crop in Honolulu for seventy-five cents apiece. He enlarged his plantation and in addition to supplying the home market now does a profitable export business.

The food of the natives from their earliest history has consisted chiefly of fish and poi. Poi is made from the root and lower part of the stem of the *Caladium esculentum* or taro, which is boiled for half an hour, then placed in a wooden trough and pounded to a fine paste with a stone pestle. It is interesting to watch the operation of poi-pounding. The operator holds the pestle in one hand, while the other is immersed in a pail of water at his side. After each stroke the base of the pestle is slapped with the wet hand, the moisture thus applied preventing the poi from sticking to it. Poi is of bluish appearance and tastes somewhat like apple sauce, although devoid of sweetness. The natives prefer it when somewhat fermented. Taro is a profitable crop, yielding usually about three hundred dollars an acre. It requires partially submerged land.

Large tracts of swamp land to the south of Honolulu have been improved by the Chinese and are now flourishing rice fields; while the deeper mud holes have been planted with the pink lotus, *Nelumbium speciosum*, the thick starchy roots of which they eat.

The vegetables found in the markets are mostly grown by the Chinese, and there are offered soja beans, Chinese cabbages (which, by the way, is a vegetable that should be grown in the States), and oriental cucumbers and gourds, side by side with almost all the vegetables found in markets here, for even potatoes and corn may be grown at from two thousand to three thousand feet above the sea. Four-fifths of the arable land of the islands is situated on Hawaii, and this island when encircled by the railway now in progress of building, and its harbor at Hilo improved, cannot fail to become of great importance.

Its lofty volcanoes pierce the clouds, causing ample rainfall and producing the most luxuriant vegetation. In the Olaa district, famous for its fine coffee, are found tree ferns from thirty to forty feet in height, with fronds fifteen feet in length and five feet broad. In fact, the tree ferns have made the coffee land, which is rich fern peat; the planter in clearing it usually saves their trunks to form sidewalks and paths. The roadsides of the Olaa district are often lined with beautiful varieties of Coleus and Brugmansia which have become wild.

Nephrolepis exaltata and several varieties of Davallia and Gleichenia form most of the undergrowth in the district between Hilo and Kilauea, while the forest comprises *Pandanus utilis*, varieties of Alsophila, Cibotium and Dicksonia. Where trees occur they are usually invested with *Asplenium nitidum*, *Smilax Sandwicensis* or *Freycinetia arborea*, the last quickly choking them and causing their decay. A tree covered with Freycinetia is, however, a most beautiful object, the green foliage and crimson bracts being very striking in appearance.

Higher up there are vast forests of the beautiful crimson flowered Lehua trees (*Metrosideros polymorpha*). Olaa should become a centre for the raising of Easter lily bulbs. The even climate, with its copious rainfall and a soil composed of fern peat overlying porous lava and affording the most ample natural drainage, gives most favorable conditions for their growth. Then as the seasons are practically obliterated here, the cultivator may plant and arrange for a crop of mature bulbs in any month of the year he may desire. There would not be as much danger of blight here as in Bermuda. A trial lot has already been planted and most encouraging reports of their success have been received.

As already stated many handsome varieties of hibiscus are indigenous to the islands, and among the most beautiful features of Honolulu are its magnificent hedges of *Hibiscus Rosa-sinensis*. Another beautiful hedge plant is the *Phyllanthus tricolor*. Imagine one of the beautiful privet hedges in Newport suddenly changed to a rosy lilac color, and some idea of the beauty of a Phyllanthus hedge may be had.

A very effective lawn bush is the so-called yellow oleander (*Thevetia nereifolia*), with clear yellow trumpet-shaped flowers. The pink oleander here attains a height of thirty feet and produces flowers as large as hybrid roses.

Flowers are seldom made into bouquets, as in the States; the natives string them in wreaths or leis, which are worn around the hat, over the shoulders, or about the waist. Carnations, yellow ginger, *Plumeria bicolor*, the scarlet seeds of the screw-pine and the crimson Lehua blossoms are thus employed. Among the natives a beautiful custom exists which it is hoped will not soon die out. When a person is about to make a journey, friends bring and present each two leis, both of which are accepted and worn until the train or boat starts, when one is returned with the last "aloha" (farewell) to the giver, and the other retained, thus providing a souvenir for each.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 17, 1900.

A meeting for Lecture and Discussion was holden today at eleven o'clock, Vice-President BENJAMIN P. WARE presiding.

The following lecture was delivered:

THE FUTURE OUTLOOK FOR THE FRUIT GROWER.

By S. D. WILLARD, Geneva, N. Y.

Mr. Willard prefaced his lecture by saying that he was fearful lest his audience should be disappointed. It is not always the simply practical man who is best able to put his thoughts into words to the highest advantage of his hearers. Much of the inspiration in regard to fruit growing has been derived from Massachusetts. Plum growing has been a feature in his life work; hence there may be varieties in regard to which he is better informed than others.

Amid the various industries that engage the attention of men in connection with soil tillage there is none that has been so neglected and yet that possesses the same attractions as fruit culture. A few whose enthusiastic love for the work has been marked with success, have been the exceptions, while the indiffer-

ence of the masses to the application of such intelligent business principles as are demanded in the prosecution of other undertakings, resulting in failure, has caused others whose capital might have found profitable investment and afforded a healthy and pleasant employment to hundreds of the best young men of our country, to take up their life work in the mercantile house or in the already overcrowded professions, all so exacting in their requirements that the limit of human endurance is reached at an early age by thousands who go to premature graves. And yet the procession is swelling, with no inclination to utilize the thousands of acres of waste lands that may be had at a price that makes them the cheapest investment of the times. Our object is to awaken a new and deeper interest in an occupation ennobling and elevating in its nature, contributing to health and long life in mankind, while assuring profitable returns to all willing to devote their energies to an intelligent effort to secure honest livings and pleasant homes free from the excitement and unnatural conditions that attach themselves to other spheres of life.

Within the memory of most of us the advice of one whose opportunities for observation had been of so wide a range as to inspire respect for his sayings, was "Young man go west." Were he living and one of this audience today, I imagine with the same prophetic visions he would say "Lay hold of and put to a practical use some of these cheap lands that may be found between the lakes and the ocean, especially adapted for products that cannot be grown as well elsewhere, which are in growing demand at home and abroad, and are required to meet the wants of a rapidly increasing population."

I offer to you my congratulations, and the Ruler of the Universe my thanks, that our homes are amid such environments, calculated to develop the best there is in man, and as we are here assembled let us not underestimate our opportunities or ignore the responsibilities we owe to the generation that is to follow, in our efforts so to shape public sentiment that our life work shall be for the greatest good to the greatest number.

A few days ago there were assembled in the city of Rochester, N. Y., for a two days' meeting the largest body of fruit growers that ever met in the Empire State, to discuss questions pertaining to their interests, and determine on what lines their future work

should be prosecuted. It was estimated that from five to six hundred were in attendance, and the greatest interest was manifested from start to finish. How great the contrast as compared with thirty years ago, when the same body in convention assembled would rarely open with an attendance of more than twenty-five or fifty. At that time the society could not be maintained from the membership fees and annually required liberal contributions from the late president and members to pay for the work of the secretary and the publication of its proceedings.

Those were indeed dark days in the history of the Western New York Fruit Growers' Society, whose members were doing better work than they supposed, and an interest was awakened, and an inspiration received from a similar work in your own State on the same lines, which has been the basis of the development of an industry today paramount to any other in the Empire State. The names of Wilder and Barry will ever live to be associated with the fruit-growing interests of the United States, and held in grateful remembrance by its advocates. Reference has been purposely made to years of persistent effort upon the part of those whose farsightedness enabled them to forecast the future. "They lived in advance of their generation."

But what of the future? There is certainly a meaning in the situation as found today in the rapidly growing interest in our favorite work, not yet, however, commensurate with the spirit of the times in which we are living. The day is not distant when a higher appreciation will be placed upon our orchard interests and their value intensified more thoroughly than the most optimistic can imagine. The era of prosperity upon which we have just entered and which has enhanced values of everything manufactured, has not yet reached the tiller of the soil to any marked extent, but sufficiently to afford encouragement and to warrant the assumption that better days are at hand for the fruit grower in the various branches of his work. This possibly may not be so marked as in other business interests, for the reason that during the period of business depression from which we have but so recently emerged, the prices of all fruit products were better maintained than was anything else sold. I find from consulting my sales book back through a period of ten years, that the average prices, while less than during the same period previous, were

yet satisfactory and afforded a profit. Indeed I know of no orchard men who were forced into bankruptcy or sold out under foreclosure.

The prices of apples have been steadily advancing until for several winters they have been held so high as to be beyond the reach of the masses, and good number one apples are really a luxury today. They are shipped to all parts of the world as green fruit, canned, and evaporated, while the skins and cores are converted into wines and jelly, so that nothing is lost or wasted. A few years ago our surplus of this fruit was marketed in the British Isles, while today the German States and Russia are calling loudly for them, with the probability that our newly acquired possessions, both in the Atlantic and Pacific, will soon be numbered among the consumers of this king of all fruits. From twelve to fifteen thousand barrels of apples of the last year's crop found their way into Russia. Seven counties in Western New York are said to have received from their apple crop not far from $5,000,000 the past season, while at the same time receiving hundreds of thousands of dollars for their pears, plums, peaches, quinces, cherries, apricots, and small fruits. Is not the outlook full of encouragement to the orchard man as well as to the land owner who may have found his work unsatisfactory in fighting competition, which will never be less, from regions unfitted by soil or climatic conditions for growing fruits that can be produced no where else as well as in New York or New England? I beg your serious consideration to this subject as deserving more thought and careful study than has usually been given it. There should be an increase of area for the production of this fruit on the cheap lands now so abundant throughout this region, accompanied with greater intelligence as to varieties especially adapted to commercial work, and more thorough culture with the purpose of growing only that of the most excellent quality.

Where is the man living who thirty years ago would have dared to predict that before the close of the century single towns in the State of New York would have produced and found profitable markets for cherries by the hundred tons, plums, peaches, pears, and quinces in much greater quantities, apricots by hundreds of bushels, and small fruits to correspond? Yet such is the fact, and the demand is yet in advance of the supply. Is not the out-

look full of encouragement to the professional fruit grower who is receiving from one hundred and fifty to three hundred dollars per acre net for his crops? A friend the past season with a thirty acre peach orchard sold his crop for a little more than seven thousand dollars, from two car loads alone realizing between fourteen and fifteen hundred dollars. The quality was superior; he made the crop by high culture. A large crop of Angouleme pears netted the shipper between fourteen and fifteen dollars per barrel, carefully estimated, the fruit being packed in bushel boxes and shipped to England. It is unnecessary to say that it was grown, packed, and handled on business principles. There were crops of plums that netted the grower from three to four hundred dollars per acre, and currants that yielded returns of four hundred dollars per acre. Instances could be multiplied of like results, and though you may say they are exceptions, is it not equally true that success is the exception in every department of life? It has ever been so, and ever will be, while intelligent industry will ever have its reward. With the wheels of industry in motion throughout the entire length and breadth of our land, offering constant employment to every man, woman, and child who desires work, I can see no reason why the grower of good fruit should not share in the general prosperity that apparently is to be a marked feature of the incoming century. But the successful fruit grower must be full of intelligence as regards his profession; and he should keep himself thoroughly read up on all the best methods to be employed in culture and feeding as well as handling and preparing for market, and the wants of the various markets sought, and last but not least, an acquaintance with all varieties of promise that are being introduced, some of which will certainly supersede those of today. Our population is changing, and with this comes a corresponding change in the taste of the purchaser and consumer. This feature I have found very marked in varieties of plums that I have been growing; varieties that are strongest in demand and sell at the top of the market today, were scarcely known fifteen years ago. This has necessitated grafting over hundreds of trees to newer sorts. Quite too many in making their selections for the contemplated orchard seem to pick from every page of a nurseryman's catalogue instead of confining themselves to a few varieties of known value, or seeking the advice of an orchardist

near by whose experience and opportunities would make him valuable counsel. Oftentimes a fruit of superior excellence is of little value to the commercial grower because lacking in the color, size, or attractive features demanded in certain markets. Color and size in nearly all fruit is at a premium, when possibly quality may be at a discount.

Not one of the fruits has been growing in demand more generally in recent years than the cherry. California has been supplying our city fruit stands with a product nice in appearance but much inferior in quality to that which can be grown easily and profitably in our own region. Should we not endeavor to supply our own market? As a rule the dark colored sweet cherries are most sought after for the trade of our cities. For years the Black Tartarian was the only sort grown for this purpose, but it is being supplanted by the Windsor, a variety having its origin in Canada and said to be very hardy, exceedingly productive, large, dark liver color, and so good in quality as to sharpen the appetite for more when eaten. I have been growing it in a moderate way for several years and only wish I had been wise enough to plant it largely when first introduced. No fruit has ever paid me better. In 1898 the crop sold for ten cents per pound, and in '99 for twelve cents per pound. It may be included in the list of money makers in all localities where any sweet cherry can be grown with success.

A few years ago I had sent to me from Oregon for test purposes a variety then known as the Bing. After fruiting it for two seasons I am inclined to regard it as an acquisition and worthy of a test by all interested in growing the cherry. It is large, of good quality, in color resembling the Windsor but ripening a trifle later, and productive beyond anything in the shape of a cherry I have ever grown. Its size and fine appearance should make it very desirable for market. I measured many specimens that had a circumference of from three to three and one-half inches, and referring to the Annual Horticultural Report of the State of Oregon find it very highly commended, and reported as the most promising cherry yet introduced there. As for sour cherries, I know of nothing superior to the Montmorency and English Morello.

It seems to be strongly in evidence that we have little to fear in

the future from the competition of Maryland and Delaware in peach growing, while on the other hand great progress is being made in the development of varieties of such hardiness in fruit bud as to be adapted to our soil and climate, and we believe we are justified in assuming that here is a field for the progressive fruit grower full of promise that has yet been scarcely considered.

The very rapid increase of insect life of an injurious character has necessitated knowledge in relation to their life work and habits that years ago were not required, and the spraying pump has come to be regarded as a necessary appendage to all well regulated fruit farms. Indeed systematic spraying at proper intervals from early spring until after the fruit is well formed is claimed as the cheapest insurance that can be provided for nearly everything grown. The wise up-to-date orchardist finds it an economical method in making a superior crop, while his careless neighbor, furnishing a feeding ground for all of the pests that abound in the vicinity, produces a crop of knotty, worthless fruit, denounces the party to whom he has consigned it for sale as a fraud, and argues that the business is overdone. This is no exaggeration but is in evidence annually.

For the past two years the increase of the tent caterpillar and forest tree caterpillar has been quite phenomenal over a large part of the State where I reside, and, when neglected, thousands of trees have been entirely stripped of their foliage, the growing crop ruined, and no opportunity given for the formation of fruit buds for the next year. Upon my own grounds more than three thousand nests of the former were destroyed upon our apple trees as soon as they were formed, and the foliage was left uninjured to perfect the buds for a future crop. This, however, was scarcely done before we discovered an innumerable number of forest tree caterpillars clustered upon the bodies of plum, cherry, and peach trees. These were likewise destroyed before injury had been done. But the roadside trees, trees on rented lands, and neighbors less careful, provided the seed bed from which emanated a crop that has enabled us to destroy during our Winter trimming between four and five thousand of the little egg clusters or bands that hatching in early spring would furnish another army to feed upon the fresh foliage.

Our agricultural colleges and experiment stations have taught

us how to contend successfully with most of these insect foes. The San José scale, however, is an exception. So minute as to be scarcely discernible except by the educated eye, and even then often requiring the aid of a microscope, this most dangerous of all insects is spreading at a rate that renders its extinction by no means probable. It has today a strong footing in most of the fruit-growing States and so far has resisted such treatment as has been effective in destroying or holding in check most other insect pests. If left undisturbed for a period of five or six years, the infested tree or plant is of little value and should be dug out and burned upon the ground where it stood. If not too large to be covered, fumigation as practised in Maryland and Virginia may be effective. An effort is being made in the Legislature now in session at Albany, for the passage of a law requiring all nurserymen in the State to fumigate all trees or plants shipped into or out of the State, which I believe to be the most effective measure yet suggested for the protection of the planter, and I believe the purchaser fully justified in insisting that such a certificate should accompany every package of trees purchased, wherever bought.

If time would permit, a further discussion of this subject might be followed I believe, with interest to the grower of all fruits, and it is in the line of my topic "The future outlook for the fruit grower." Indeed I believe I should be recreant to the trust you have reposed in me, did I not sound the word of warning, and I say beware of the danger of introducing into your orchards this most serious menace to the fruit grower's interests, the San José scale.

Mr. Willard added that he could not understand why with all the cheap reading matter so abundantly disseminated so little is found in our farm homes. It is the first thing that he looks for in the morning, and the last thing at night, yet in many houses there is a dearth of it. He recently visited one man who has one hundred and thirty acres of land, nearly all orchard, and six hundred chickens but not a particle of reading matter.

The land on which our fruit orchards have hitherto been located are high-priced lands — $150 per acre, besides the cost of draining, which brings it up to $200. Every particle of land must be utilized. He planted a row of Windsor cherry trees alongside of

a road, and told his wife that the revenue from these trees would pay the taxes when they were too old to do it. Last year they did pay the taxes. His crop of ten tons of English Morello cherries went chiefly to persons in New York, who expressed the juice.

Probably we shall not have as much competition from Delaware and Maryland as heretofore. One orchard of twenty-eight thousand trees was blotted out by the San José scale. In Michigan, not far from Benton Harbor, is the best peach grower he knows of. His orchard is one hundred acres in extent and last year the crop sold for $35,000. He thins his fruit to six inches apart. He begins spraying at this season and follows it up.

In growing plums, Mr. Willard advised to protect from the curculio by jarring; he uses machines for this purpose. His foreman, in the spring of 1899, thought there was no need of jarring, for few curculios were being found, but they found great numbers of forest caterpillars feeding ravenously and in clusters on the bodies of the trees.

He had known repeated instances where trees had been dug up and the parts of roots left in the ground had sent up shoots which in two years had been covered with the San José scale.

At the date of the introduction of the Japan Plums, he obtained several lots of scions from California marked Botan. Observing what seemed to be a difference among them, they were grafted and recorded under numbers, one of them as Number 26. And from this trees were grown and sold to Mr. Heikes, of Huntsville, Ala., who renamed the variety the Willard plum. Its chief value was the early ripening of its fruit, but it has since been superseded by the Red June, which is earlier and in all respects more valuable.

Discussion.

William C. Strong asked about the President Wilder currant. Mr. Willard said that it had its origin in Indiana and is said to be a seedling of the Versaillaise. You may feed it all you please yet the wood will be strong, and the bushes will not break down, which cannot be done with Fay's. The berries are as large as those of the Cherry currant but the bunches are twice as long. Cherry currants must be marketed as soon as ripe whereas the President Wilder may be left for a long time on the bushes after it is ripe. No other will keep as long. Bushes four or five years

old yield from ten to twelve quarts of fruit. The first which he grew sold for twelve cents a quart in Boston market.

When asked about the North Star currant Mr. Willard said he would relegate it to the North Pole. The Red Cross has fruit of excellent quality but has failed to come up to the standard of a market fruit. For family use he considers the White Imperial best. No white currant is of value for market.

In answer to a question by William H. Spooner as to the Pomona currant the lecturer said if you want to get a good crop of the San José scale you can get it on the Pomona currant. T. G. Yeomans of Walworth, N. Y., bought some of them and soon found them covered with the San José scale. Instead of digging up and burning them he had them sprayed with one hundred per cent kerosene when they were beginning to develop. In September he found that the bushes though not killed were injured and still loaded with the San José scale. Mr. Willard said that he has all packages shipped marked with certificates of inspection. He recommended Bulletin No. 57 of the Maryland Agricultural Experiment Station, on the San José scale in Maryland and remedies for its suppression and control, by Professor W. G. Johnson, as the most practical treatise on the subject he had ever read.

The Chairman asked how to prevent the San José scale and Mr. Willard advised fumigating all trees as soon as received. The first thing he would do would be to put up a little box of his own for that purpose. No nurseryman raises all the trees he sells, and those he buys from somebody else are often infested. He considers inspection only partial protection to the orchardist and would urge the passage of a law compelling the fumigation of everything sold. He was Chairman of a Committee of the Western New York Horticultural Society to urge the passage of such a law. The bill proposed in the National legislature would be no protection. Fumigation is inexpensive when once you have the facilities. It takes about half an hour. The average cost, outside of labor, for the best apple, pear, peach, plum, and cherry trees is about twelve and a half cents for a thousand trees; labor would be as much more. In Maryland Professor Johnson says they have been absolutely exterminated by fumigation. Few are found in old orchards; they have only been introduced within a few years.

J. W. Manning asked whether it is known that this process kills the insect, and the lecturer again referred to Bulletin 57 of the Maryland Experiment Station, in which Professor Johnson says they were so thoroughly killed that none were seen for two years. Mr. Manning quoted Professor Alwood, who thinks the process does not kill all the insects. He says ten per cent will be left. Mr. Manning had had his nursery inspected by Professor Kirkland and had never found any of the insects until a year ago last spring, when he found a few. Professor Kirkland then said that he must make a fumigator, which he did at a cost of about five hundred dollars. He puts everything through the fumigator, but they are getting into forest trees and he feels that the case is almost hopeless. He wished to know if there are any trees which the San José scale does not work on. Mr. Willard said they will not get on evergreens, sour cherries, or the Keiffer pear.

Thomas Harrison asked if the Governor Wood cherry was of any value as a market cherry, but the lecturer had found it of no great value. It is not a good shipper and not the right color. Light colored cherries are more likely to decay.

In answer to a question as to plums, Mr. Willard said that he had tried to test them all. He found the Burbank and Red June most valuable for market. The Reine Claude de Bavay although the standard of quality is not so good for market. The Wickson, he thinks, has not yet been sufficiently tested.

On motion of Benjamin P. Ware a vote of thanks to the lecturer was unanimously passed.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 24, 1900.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following lecture, illustrated with lantern slides, was delivered under the auspices of the American Forestry Association.

Forestry in Massachusetts.

I. *Forestry.*
II. *Roadsides.*

By Mrs. Mary Lathrop Tucker, Newton.

I. *Forestry.*

In the part of this lecture dealing with forestry proper I shall endeavor to set forth a few of the considerations which should induce farmers in Massachusetts to cultivate timber, and to state as plainly as possible some of the most important principles underlying the proper treatment of woodlands, especially White Pine. Many important points have of course been omitted, as one lecture could not be exhaustive on even the simplest elements of forestry. Yet with these principles as a starting point, common sense and a little experience should enable a small farmer to improve and increase his woodland so much in a few years as to convince him beyond doubt of the profitableness of timber culture.

One of the most common and most vital of all mistaken notions about tree growth is that trees need no cultivation — that nature let alone will always produce the best possible results, both economic and aesthetic. Farmers would be astonished at the suggestion that wild cherries, apples, potatoes, or corn are as good as the cultivated species, or that weeds do no harm growing freely among their valuable crops. But many of these same farmers are hard to convince that large numbers of trees in their wood lots are mere weeds of no worth in themselves and injurious to the growth of the valuable timber, and that the value of their timber might be easily doubled or trebled by a little rational management.

It is a fact which lies at the foundation of all proper forestry that natural, uncared-for woodlands do not produce the most or the best timber. Unaided nature does often produce magnificent results, and up to the present time we have in this country been able to depend for our timber supply almost wholly upon the wild natural product. So when people are urged to practise systematic forestry — that is, to cultivate trees as civilized man cultivates

other crops instead of trusting like savages to the chance productions of nature, they are apt to point to the Pines of Maine or Georgia, to the New Hampshire Spruces, or the Sequoias of the Pacific coast as conclusive evidence that whatever assistance nature may require in producing the best and the most potatoes she is perfectly competent to raise trees without human interference.

But granted the best that nature can do, we are still confronted by conditions that will compel us to cultivate trees or soon to buy our timber of other countries more provident than ourselves. In the first place we have cut off or burned or allowed to burn nearly all our finest timber and cannot afford to wait for more to grow wild. For while unaided nature does, as we admit, produce wonderful results, it is only through a slow process of selection and elimination and a long, fierce struggle, often to be counted by centuries rather than by years or decades, that such results are evolved, and they are never sure in advance. Left by herself fifty or one hundred years nature is much more apt to give us timber stunted or worthless, with only here and there a good tree, and even with unlimited time she may do no better. Let anyone who doubts these statements visit a Massachusetts forest of natural mixed timber a hundred years old and in all but exceptional cases he will find most of the trees surprisingly small, comparatively few of even the oldest trees having a diameter over ten or twelve inches. Crowded by one another all their lives out of needed light, space, and air, they have grown in height with only slow increase in volume. Then the few trees that have managed to outstrip their neighbors have likewise been so hampered during much of their growth as to make their timber of comparatively little worth, and all have grown so slowly, as evidenced by the closely-packed annual rings, that the heart wood is often decayed before the tree has attained a third of its normal size. Moreover much of the ground is occupied by less valuable species; indeed, it is sometimes these very weed trees which overtop and crowd out the valuable timber, for the fittest, especially the temporarily fittest, is not always the best. Given a few thousand years more or less and nature might turn this forest into one of those marvelous productions which give us such confidence in her unassisted operations, or it might remain about as we see it today. But even supposing that with time the best results were sure, can we

afford such an enormous waste of time and material as unaided nature requires for her best work? The hot-headed American, when urged to raise timber scientifically as an investment, looks at you in surprise as an unpractical theorist and asks how you suppose he can wait fifty or seventy-five years for a return on his outlay. Such a man will not be likely to let his land remain in forest and leave it to his children to do the same waiting by the century for nature's slow processes that his posterity in some remote generation may reap the same magnificent timber harvest that we and our forefathers have been squandering. No, he will strip his woodland of its poor sprout Oak or scraggy Pine as fast as it is large enough for firewood or any other salable purpose, buying meanwhile the best timber elsewhere. But nature's most successful efforts have probably never produced, even with unlimited time so large a crop of the best timber as might have been raised on the same area with scientific cultivation—that is by assisting and hastening nature's own processes. In other words man can raise more and better timber on a given piece of land in from fifty to one hundred years than will be likely to grow wild in a thousand. And if in a century or half a century we can by cultivation raise a forest where every tree shall be a good tree why are we content with anything less? The practical question is, just how much cultivation it is profitable or desirable to give, for there is every possible degree of forest management from the most elementary to the most elaborate application of the principles of forestry. Just where for the New England farmer is the dividing line between profit and loss? We know that timber culture pays because many States and towns abroad derive very large revenues from this source. But will it pay on a small farm in Massachusetts? If so, what timber is it best to raise and by what processes, and how much labor and capital is it worth while to put into it?

There seems to me little doubt that, for the present at least, White Pine is the best timber crop for the average Massachusetts farmer. The wood is always in demand, having no substitute at all comparable to it, and our supply of the first-class article is in this State, as largely elsewhere, nearly exhausted. White Pine springs up readily almost everywhere on worthless pasture land or sandy wastes where hardly anything else of value can grow.

Among the Berkshire Hills it appears to be the only antidote for the all-encroaching shrubby cinquefoil, crowding out the pest when nothing else avails. Everywhere it seems begging to show what it could do with only a chance if man were not too obtuse to take the hint. There are thousands of acres of this poor cheap land in Massachusetts lying idle or growing up with young Pine which farmers often take more pains to destroy than all the labor they would need to put into its cultivation, cutting and burning it over to get for their cattle a barren pasturage not fit for goats. With a small investment of labor and capital all this land might soon yield a good revenue both to its owners and to the State, except by the seashore, where, affected by the salt water, White Pine will not grow, and there its place is taken by Pitch Pine, which also might be turned to better account than it is. White Pine, too, yields perhaps the quickest and largest returns of any valuable timber tree in this State, and there is little risk in its cultivation except from fire. But when land owners all over the State are raising high-priced timber public sentiment will demand more stringent laws for the prevention of forest fires and will see that they are executed.

The successful cultivation of White Pine depends upon very simple principles, which may be applied with any degree of elaboration. To gain the best growth seedlings should come up very thickly at first and then be thinned and pruned as they need more light, air, and space. Spots where they do not come up thickly enough should be reseeded. The seedlings need protection from sun and storm. This protection is often furnished naturally by small bushes like blueberry or sweet fern, or by herbaceous plants such as hardhack or golden-rod, or by other seedlings or sprout growth, as birch or oak, which should be removed when no longer needed. In seeding bare ground some cheap, quickly-growing crop like rye may be sown with the Pine seed to shade the seedlings the first year. Close planting is necessary to secure both vertical growth and clear timber free from knots. A Pine or other evergreen coming up in the open grows with large spreading branches close to the ground, more like an enormous bush than like a tree. But when the trees are crowded closely, the lower branches not having room to develop soon die and the nourishment that would have been wasted upon them, speaking from a timber-producing

standpoint, goes to feed the trunk, forcing it upward and making it tall and large. If we wish, therefore, to produce the largest amount of timber we must have the fewest possible side branches. Killing off side branches by close crowding is called natural pruning, but with many trees this natural process needs to be supplemented with artificial aid. This is especially true of the White Pine, on which the dead branches are very persistent. One sometimes sees thick Pine woods fifty years old or more with dead limbs clinging to the trunk nearly to the ground, thus showing that they have never shed many even of their first little branches. Every Pine branch starts a mere point from the heart of the tree and makes, as long as it lives, a fast red knot of increasing size in the timber through which it grows. But when a limb dies its annual increase of course stops, while that of the trunk around it goes on, so year by year the wood of the trunk grows out over the dead limb, often leaving a space between the live wood and the dead, thus making from the point where it died a loose black knot set in a constantly deepening hole. Dead limbs, therefore, even more than live ones, spoil the quality of timber, and superfluous branches should accordingly be pruned off as soon as they die, if not before. Then if the cutting be properly done the bark will soon close smoothly over the wound, leaving only a small knot near the heart of the tree and clear timber outside. Pruning, indeed, both natural and artificial, is perhaps the most important factor in the production of a good, as well as a large, timber crop, since every side branch means a knot of corresponding size in the trunk from which it springs, and the earlier the branch is removed the smaller will be the knot and the less the amount of timber affected by it. Close planting is valuable also for the protection and support thus afforded by the trees to one another as well as for economy of space. But as the trees grow larger they interfere so much with one another's light, air, and space that the seedlings die in great numbers. Then as the survivors increase in size the weaker trees continue to be killed by the encroachments of the stronger or more rapid growing. This killing out of weaker trees by close crowding is called natural thinning and like natural pruning plays a most important part in the development of a timber forest. But the struggle is so great that all the trees suffer more or less and the growth of even the

strongest is retarded, and sometimes the whole woodland becomes stunted and sickly, since rapid growth is necessary to make the best timber. So here again man must lend a hand, helping to thin out the weaker trees and removing everything that can interfere with the development of the best. The process of thinning calls for some degree of care and judgment, but intelligent observation and experimental practice will quickly educate even the inexperienced.

These same principles underlie the treatment of old uncared-for woodland. Suppose a farmer wishes to improve his wood lot, containing White Pine of different ages with a mixture of other growth. First, the other wood should be removed, as fast as no longer needed for support or protection to the young Pines, though sometimes in the case of valuable species mixed timber may be grown very successfully. But every inferior tree should be weeded out as carefully as one would weed potatoes or corn. Then most of the old Pines should also be removed, unless these too are needed awhile for protection, for if Pines have not been thinned and pruned while small it hardly pays to spend time and labor upon them as so much timber is likely to be already knotty and poor. But care should be taken to leave seed trees here and there in order to secure natural reproduction, for it is cheaper and better to depend as far as possible upon natural reseeding rather than planting. Only the best trees should be left for this purpose since good stock to seed from is as important as good pedigree for calves and colts. Planting should be necessary only in foresting waste land or in filling gaps in the natural growth. While clearing out the old and inferior growth from the wood lot the remaining trees, the crop to be cultivated, should be thinned and pruned and all thin or bare spots filled in by planting or natural seeding. A natural woodland properly managed should more than double its value in twenty years, when many of the largest trees will be ready to cut at a good profit, while the wood taken out meanwhile by weeding, thinning, and pruning yields just as good a return as though cut in the ordinary way, merely for its own value.

To sum up:—Rapid, healthy, vertical growth makes the best and the most timber. To this end trees should come up very thickly and then be thinned and pruned as they need more light,

air, and space. If, on the contrary, they come up too far apart, they grow branching and bushy, making the timber short, small, and full of knots. Some trees need or bear more shade than others and all need more in their early growth than later. Close crowding during the first forty or fifty years kills off side branches producing tall, clean trunks and clear straight-grained timber free from knots, and it also kills out the weaker, poorer trees; but too close and long-continued crowding stunts and injures the whole forest. Killing side branches by crowding is called natural pruning. Killing out the weaker trees by crowding is called natural thinning. The main problem of forestry is so to balance these processes and to supplement them with artificial thinning and pruning, natural reseeding and planting—in other words, so to direct and assist nature, "as to produce and reproduce the largest amount of the most useful wood on the smallest possible area with the least expenditure of labor and money and the least interference with natural conditions."

Timber should not be harvested too soon or remain standing too long. Every tree has its period of growth, maturity, and decay. From an æsthetic point of view maturity may mark only the beginning of a tree's highest value, but as timber it ought not to stand beyond that period and would probably be better cut before. For some purposes young timber is desirable or necessary, while for others it should attain its utmost growth. For instance, Willow sprouts for gunpowder can be cut once in eight or nine years; White Pine is best for match wood about eight or ten inches in diameter; and Chestnut will grow good telegraph poles in thirty years; but for construction timber the largest trees are almost always the best. Other things being equal, there is much more profit in large trees than in small ones. A man of long experience and observation in timber raising tells me that he once asked a careful and experienced lumberman who had been cutting down a lot of trees, large and small, to estimate the cost of taking from the standing trees enough of his smaller logs to make one thousand feet of manufactured lumber and putting it upon the market. The lumberman was greatly surprised to find by his own figuring that his small logs would not, when put upon the market as manufactured lumber, bring what he would have paid out upon them. He had not only lost his young trees, each

one of which, by standing longer, might have produced more than a thousand feet, but it cost him good money to get rid of them. It costs comparatively little to put one thousand feet of lumber on the market if it comes out of one tree, and it brings a high price, but it costs a great deal more per thousand feet when it takes thirty, forty, or fifty trees to make that amount, and this small lumber sells for a very low price. Indeed, the simplest and most elementary forest management consists in cutting only the trees of sufficient size, leaving the smaller ones to mature in their turn, instead of clearing the land and perhaps letting it be burnt over and sold for taxes. After woodland has been brought under proper cultivation as exact an estimate can be made of the annual or periodic crop of wood to be expected from one piece of land as of potatoes or wheat from another,—more exact, indeed, as trees are of course far less dependent on one season's weather.

In the United States comparatively little has yet been done in the line of thorough, systematic forestry, though many good beginnings have been made in almost every section of the country. Even lumbermen are waking up to the necessity of harvesting their timber with an eye to the future. Small farmers are perhaps the last to realize the advantage of cultivating the timber they have and planting more, but an increasingly large number are beginning to do it or to seek information on the subject; still others are open to conviction, while a few have already managed their woodland on common sense principles long enough to prove the superiority of such methods. Of these last Mr. Fred A. Cutter of Pelham, New Hampshire, is an excellent example. I go out of our own State because I do not know where to find just the same work in Massachusetts and my object is to show not merely what is done at home but also what might and ought to be done here. Pelham being just over the Massachusetts border presents conditions identical with our own. The most valuable feature in Mr. Cutter's operations seems to me to be their combined simplicity and effectiveness. They require no long training nor even much experience, and but the smallest outlay of capital and labor. There is nothing in them that any farmer cannot put into immediate practice on his own wood lot with the prospect of eventually doubling his profits and even in many cases beginning to get considerable returns in from ten to twenty years.

Mr. Cutter's woodland is a part of ninety acres taken up by his grandfather in 1792. It was then covered by a heavy growth of Oak with a few stray Pines here and there. About 1816 this timber was all blown down in a gale. Sixty-six years ago Mr. Cutter's father moved from Brookline, Massachusetts, back to his native home, where he put up a large set of buildings for which he had to buy the timber, as there was no Pine on the place except a few trees mixed with the Oak which had grown up after the blow-down. The Oak was cut down and from those scattering Pines a tract of forty acres was thickly seeded, nearly all of which has been thinned and pruned. Fifty years ago they began pruning perhaps an acre a year and thinning as needed, and now from the forty acres have been already cut 700,000 feet of timber, while about 300,000 feet are still standing. It is estimated that the timber already cut has netted more than ten thousand dollars clear profit and that two thousand dollars' worth remains which is increasing in value every year. Mr. Cutter harvested his best timber, which brought from $150 to $200 the acre standing, five years ago. From one square rod he cut 2800 feet, for which he received twenty-eight dollars delivered in logs. On one lot containing trees fifty-five years old seven-eighths of the trees made logs sixty-four feet long, the timber completely free from knots outside a small space near the heart where the limbs were sawn off and many of the trees sawed one thousand feet and upwards of clear timber. Upon the ground cut over five years ago Pines are thickly seeding in from the seed trees left for reproduction. To illustrate how closely Pines may come up to advantage, on one lot now covered with fine young trees ready for the second thinning and pruning the saplings were so thick before the first thinning that by actual experiment among them one person could not see another at a distance of eight feet. Mr. Cutter's large Pine now standing is worth from $75 to $125 the acre, according to size and to the attention that has been bestowed upon it, and will be worth more when ready to cut some years hence. He thinks that Pines should not be thinned and pruned until fifteen or twenty feet high, believing that not until that time will nature have fully shown which are the fittest to survive, and that up to that size no knots develop sufficiently to injure seriously the general quality of the timber. He always prunes with a saw, never

with an axe. I call special attention to these points because later I shall describe successful timber culture by quite different methods. At the first pruning Mr. Cutter trims only within reach standing on the ground, or as far up as there are any dead limbs, and thins by selecting the poorest and weakest to cut out. The remaining trees then shoot up and make much more rapid increase in height and volume than before. The second thinning and pruning are done ten or fifteen years later. This time the pruning is done from a ladder and in thinning only the dead or dying trees are cut out. Mr. Cutter estimates that the first thinning and pruning costs about five dollars per acre and that the second pays for itself in the wood taken out. So all that is made by the operation over five dollars an acre is clear profit. One who deals with trees always with an eye to their best development acquires a keenness in seeing the possibilities, æsthetic or economic, of even a single tree, utterly lacking in the man who lets his wood grow up haphazard, with no love for the trees and without a serious thought for their welfare, and harvests it in the same way. While cutting off a heavy growth of Pine Mr. Cutter came across a fine little Oak which the woodman was about to cut down and which would have been good for nothing but a few sticks of firewood. But Mr. Cutter told him to let it stand as it could do no harm and might be wanted sometime. Freed from the shade of the Pines it grew rapidly and twelve years after when the Pine saplings were growing up thick around it, a man came along who said, "There is just the tree I have been looking for to make a post for my cider mill!" He paid Mr. Cutter twelve dollars for ten feet of the trunk and cut it himself, while the rest of the tree netted ten dollars for cord wood. There was twenty dollars clear gain from a tree that would otherwise have been thoughtlessly cut down and which cost absolutely nothing to grow. The great advantage of tree culture on a farm is that trees grow and flourish, silently rolling up the profits, not only while the farmer is sleeping but while he is doing and earning quite as much in other lines, for land can be utilized for trees which is worth little or nothing for anything else, and the work of planting, thinning, and pruning can be got in at odd times that hardly count at all. About thirty years ago a man and his young son went out one rainy morning and set out on a sandy knoll of half an acre or so

some White Pine seedlings taken from an adjoining piece of land. The ground planted was worth about three dollars; the labor of setting out, thinning, and pruning might be four dollars, the whole amounting, with interest in thirty years, to perhaps sixteen dollars. The trees are now valued at forty dollars on the stump, which would seem a pretty good return on so small an investment. Given twenty years longer they will be worth much more and with a larger outlay of labor their value might probably have been still further increased. The land from which this man took his seedlings was at that time covered with a heavy growth of young Pine. This has now been cut off, the last cutting having been finished about four years ago. There were taken off 700,000 feet of timber bringing $3,500 on an investment of $300, and the land still left. It is now covered with a thick growth of seedling Oak which with suitable care would make fine timber for some uses in twenty to thirty years, while with more time its value would increase proportionately.

The White Pine land of Mr. Nathaniel Morton, of Plymouth, Massachusetts, affords an excellent example of good forestry based on the same general principles as Mr. Cutter's, but carried out in detail by different methods. Nine years ago Mr. Morton bought for four hundred dollars fifty acres of woodland near Plymouth. The sandy soil was then covered with a mixed growth of White Pine and sprout Oak, the Oak being usually the more abundant. From this tract the previous owner had almost yearly for many years been cutting out the best firewood. But Mr. Morton wanted to raise Pine, so he began at once to remove all the Oak that interfered with or shaded too much the young Pine, while yet leaving enough to protect the ground, and so encourage the sprouting of the Pine seed with which the soil was well supplied, and also to shade the seedlings as long as needed. The Pines, however, after passing the seedling stage, have seemed to to do best on ground from which all the trees had been removed and Mr. Morton now questions whether the huckleberry and other low growth would not have furnished enough shade for seeds and seedlings if all the Oak had been cut off at once. Mr. Morton's pruning differs from that of most Pine growers in several particulars and he has by independent experimentation reached many of the same conclusions as Des Cars and other eminent authorities.

In describing his methods I shall make large use of his own words but as these will be connected and supplemented by my own, quotation marks will be omitted.

In dealing with his Pine Mr. Morton began by trimming off all dead branches as high as could be reached from the ground with an axe, and occasionally cutting live limbs also to the same height. His method for the first four years was to prune the limbs as closely as could be done without injury to the bark of the trunk, but sometimes the cut would accidentally extend into the trunk, and in smoothing the wound some bark would be removed all around the cut. In a few years it was found that the scars made by limbs thus cut off had become partly or wholly covered with new bark while the scars made without cutting into the bark of the trunk had not healed over and showed little or no signs of doing so. Most of Mr. Morton's pruning for the last four or five years has been done on the plan of cutting into the trunk enough to make a scar about twice the diameter of the limb taken off and cutting deep enough on all sides of the limb to be sure to cut through the inner bark of the trunk, for if the bark on any part is left unbroken it will not close in upon that side and longer time will be needed to cover the wound with new bark. Live limbs of all sizes up to three inches in diameter and some even larger ones have been cut off in this way and the scars give promise of becoming entirely covered with new bark. All his trees five feet high and over have had one or more rows of the lower limbs pruned off, the plan being to continue such trimming yearly until all limbs have been removed to the height of twenty feet or more, always leaving enough top limbs to promote the best growth of the tree.

It will be seen that the chief peculiarities of Mr. Morton's treatment as he has worked it out up to the present time consist, first, in pruning branches close to and even with the trunk and then smoothing the wound by cutting all around well into the trunk bark, and, second, not only in pruning off live limbs as well as dead ones, as he has done upon the older Pines, but also in pruning trees so young that there are only or mainly live limbs to prune; in other words he forestalls the process of natural pruning by pruning himself before nature has a chance to get in her work at all. We shall have occasion to return to these points later in speaking of the pruning of shade trees. Mr. Morton's Pines,

as he is himself careful to state, are too young for one to speak with absolute certainty of final results but everything promises remarkable success. Experiments show that wounds made by pruning small branches as carefully as possible in the usual way have not nearly healed in five years and the tree has in some cases grown outward around the scar, leaving holes in the trunk, while other wounds made on the same tree in pruning similar branches by cutting into the bark on all sides even with the trunk have closed smoothly over in three years. Also trees pruned before the branches begin to die naturally show better growth than those on which artificial pruning is used only to aid or supplement the natural process. As to general results thus far one has but to compare Mr. Morton's Pines with woodland across the road exactly similar to his own when he began work upon it nine years ago. The one tract is covered by sprout Oak with a few poor Pines and sickly young seedlings, dying for lack of chance to grow. On the other is a sturdy growth of vigorous young Pine of various sizes with clean straight trunks and healthy tops, and on this piece the wood bulk has increased fifty per cent in seven years, that is, since clearing out the Oak and giving it a fair start. Mr. Morton prunes almost wholly with axe and knife—a large knife for cutting live branches up to about an inch in diameter and a thin sharp axe for cutting and smoothing all other limbs. For working on or near the ground he uses a long handled axe and for trimming upper limbs one with a short handle. The pruner should carry a whetstone to use many times a day, as a dull tool is likely to injure the tree. Mr. Morton is doing a variety of experimental and observational work with trees, both individually and in the mass, the results of which are watched with interest by experts.

Both Mr. Morton and Mr. Cutter are very glad to show their woodland to visitors and to answer any questions as to methods or results.

II. *Roadsides.*

We have thus far been discussing trees only in woodlands and from a pecuniary standpoint. Forests of course possess also as great economic importance in other directions, as in their products and the profits to be derived from them, while to many of us their spiritual values of beauty and sublimity and inspiration

make the strongest appeal of all. Bnt I have held myself strictly to a basis of dollars and cents, because under our present organization of society few can or will cultivate woodland, or even let it stand very long, without assurance of a sufficient tangible return.

It has been truly said that "if the forests should disappear civilization would become extinguished on the earth." The same could perhaps hardly be said of street and roadside trees and other growth, and yet a state of society which destroyed or deliberately discouraged or even failed to encourage all such adornment would certainly need civilizing. In the consideration of forests, however we may value their beauty, economic factors must, as we have intimated, receive the main stress, but we cannot deal with roadsides without combining the two values, æsthetic and economic, and here the æsthetic must preponderate. The practical values are just as truly there as in the timber forest, in the health, comfort, convenience, and pleasure that all may enjoy from well shaded and adorned streets and roads; and health, comfort, convenience, and pleasure are just what above all else we want, if we can, to buy for ourselves with the profits of timber raising. The moment we look upon beautiful streets and roads as one of the comforts of life necessary to be provided for everybody the problem will be solved and our civilization will have made a large advance.

We have time merely to touch upon a few points of roadside treatment, some of which might easily furnish the subject of an entire lecture. For convenience, since they require different treatment, I will speak separately of city or village streets and country roads, and shall confine myself almost wholly to the question of protecting and fostering the growth that we already have or that nature supplies when we let her do so.

The most obvious protection needed by street trees is from external injuries. It is almost worse than useless to plant fine trees only to allow them to be killed or injured by the gnawing of horses, the grazing of wheels, or the assaults of thoughtless boys and other persons. Every small tree and all large trees in exposed positions should be guarded, though large trees usually need guarding only on the side toward the street. Guards should be of strong-meshed wire, not "chicken wire;" be fastened securely, but not tightly enough to bind, and be

enlarged with or in advance of the growth of the tree. It is poor economy to put on a guard low enough for horses to reach over; the guard should be six feet high unless the tree is so small that this would interfere with the lower branches, in which case the tree should have, if possible, a protection wide and strong enough to keep enemies at a respectful distance. Sometimes a tree, especially a Rock Maple, is liable in swaying to chafe against the top of the tree guard. This is easily and most effectively prevented by tying two soft stout strings at right angles to each other near the top of the guard, which should be considerably larger than the trunk, then passing the strings on either side of the stem through the wires opposite and returning to the points of starting and there fastening. This stringing will usually last a whole season and may not be needed the following year when the tree has become firmly established. Many devices have been tried by the Brookline Town Forester but this has proved in every way the best. The wire for tree guards recommended by the Massachusetts Forestry Association is called No. 1-16, the best widths thirty-two and seventy-two inches, net price at wholesale about four cents a square foot, and should be attached by copper wire which stretches as the tree expands. Through the influence of the public spirited Roxburghe (Woman's) Club in Roxbury, nine thousand street trees have recently been guarded and Mr. Doogue will soon begin work on the smaller trees. Mr. Doogue has also promised to give one thousand trees to the Roxburghe Club this spring to be distributed by them among those persons who will plant and care for them. This Club had about two hundred trees planted two years ago and sets an excellent example in taking quite as much interest in guarding and otherwise caring for trees as in planting them.

From injuries by electric wires there seems to be little hope of complete protection until all wires are buried, but something can even now be done by strict supervision and by holding corporations owning the wires responsible for all maltreatment. Damages have been and can be recovered for injuries of this kind. Of protection from insect pests and from disease there is here no time to speak except to give an incidental hint here and there in connection with other matters.

There are few ways in which shade trees receive more serious

injury than from bad pruning or the lack of pruning. We have seen that the pruning of all forest trees, beginning when they are saplings, is a most important factor in the production of good timber. The pruning of every shade tree is not in the same way a matter of course necessity at any particular period of its life, yet every shade tree is practically sure at some time to stand in greater or less need of surgical treatment. The pruning of timber trees consists mainly in taking the lower limbs off successively as the tree develops, in order to increase growth at the top, thus producing tall straight-grained trunks. Street trees may need pruning at any time from early youth to extreme old age and for a variety of causes which can be summed up under two heads :— First, in order to improve or modify the shape of a tree for the sake of greater beauty or convenience or for a more healthy growth. Second, to guard against or to cure decay, disease, or deformity.

The first object of pruning, to improve the shape of a tree, is not intended to mean the production of any stiff, formal effects but only to restore or train a tree to its normal outline by correcting tendencies toward exaggeration or by repressing or shortening sportively inclined branches that injure its natural symmetry. For instance, the spreading Oak may spread so far that the lower branches become disproportionately large at the expense of the upper ones, which may consequently decay, while the heavy lower limbs are apt to be broken by wind or by snow and ice and the whole tree thus loses not only beauty but also health and perhaps life. Or one or two branches may protrude so far beyond the outline of a round or pyramidal tree as to mar greatly the general effect. Such branches need cutting back enough to conform to the natural shape of the tree. Besides the disfigurement they cause, these unruly branches are also apt to be broken by wind or storm, thus endangering health as well as beauty. Many street trees need higher trimming for the convenience of passers by and of vehicles, and for the sake of more light and air and a higher view.

Second, how, taking our trees as they are, shall we by right pruning guard against or cure disease and decay? To begin with, cut off all dead or dying limbs, which carry death back into the tree itself. All branches, too, which chafe or cross should be

removed, for their bark becomes broken and they cannot remain sound. Broken branches and stubs, remnants of limbs of any sort, and all sprouts upon the trunk and unsightly protuberances should be pruned off. Wounds, cavities, and loosened bark all invite disease and insect pests, and need immediate treatment.

But if we stop here half the story has not been told. More really depends upon the manner in which it is done than upon the pruning itself. Indeed many persons interested in trees object to pruning for the very reason that it causes decay and disease. Lumber dealers especially are often opposed to pruning and are inclined to reject pruned logs. But it is the method and not the fact of pruning which is at fault. Go through almost any town or village in Massachusetts, even where some pains are taken to preserve the trees, observe the pruning and its results and you cannot fail to be convinced that bad pruning is responsible for the deformity, decay, disease, and death of large numbers of our street and roadside trees. Ugly protuberances, scars left by old wounds never or badly healed, dark cavities lined with fungous growth and rotting into the trunk, stumps of branches cut off anywhere from two or three inches to as many feet from the trunk or limb to which they belong, and shrunken and decayed according to the length of time they have been cut, loosened bark furnishing breeding places for insect enemies — some or all these and other forms of evil will one be likely to find on most trees of any size, especially on mature trees which ought instead to be in the prime of perfection and beauty. Nearly all such evils are the consequence of bad pruning, and it is bad pruning which has brought all pruning into disrepute and is really almost worse than none at all.

But what makes any pruning good or bad and why? The main principle on which the whole result depends is the same that Mr. Morton discovered by accident and careful observation and confirmed by experiment, and can be expressed in a single rule, namely :— In pruning remove every branch, large or small, living or dead, by cutting it off close to and perfectly even with the trunk or limb from which it springs. This necessarily involves cutting into the live bark around the wound and in this way only, especially on deciduous trees, can rapid and complete healing be effected. The reason for this will be at once obvious to one who

understands the process of wood formation. Sap forms wood or bark only on its return journey from leaves to roots. Therefore, no wound can heal unless its edges — that is the live bark around its edges — are in direct communication with leaves through the returning sap. But when a limb is cut off at any distance from the trunk the wound cannot be reached by sap because there are no leaves beyond to lift the ascending sap in that direction or to elaborate it into wood and bark-producing material and send it back to repair damages. The stub therefore dies and gradually decays down into the tree, producing eventually one of those dangerous cavities which I have mentioned. When properly done trees bear a surprisingly large amount of cutting without injury. It is perfectly safe to cut off at least one-half of the trunk circumference in bark and sometimes two-thirds when the tree is thrifty.

As to the best season for pruning, authorities differ except in the case of Maples and coniferous trees, which should never be cut while the sap is running. Summer is the best season for these. Besides the pruning of branches, protuberances on the trunk, ofter caused by trimming near to but not even with the trunk, should be cut off smooth in the same way as pruned limbs, and all cavities should be thoroughly cleaned out and filled with elastic cement or with small stones and then covered with the cement. There are many very important but simple and common sense details which should be observed in pruning, but which must here be omitted except to add that on all shade trees the wounds made by pruning should be immediately covered with a coating of paint or coal tar — tar is better — in order to protect the exposed wood-cells from insects and decay. On coniferous trees, like Pines, the resin or pitch answers to some extent the same purpose, especially in the shade of the forest, where, besides, it would be impracticable to tar every wound. But resinous trees growing in the open and, therefore, exposed to sunburn and other dangers would better have their wounds dressed like any other shade or ornamental trees.

The reason why so much bad pruning is tolerated is partly because few people know that it is bad, seeming to regard most blemishes on trees quite as much a matter of course as the falling of autumn leaves. Besides, pruning properly performed takes four or five times as long to do as poor pruning and when the

same price can be obtained men professing to be experts injure beautiful trees by poor work, presuming on the ignorance of the owners. Pruners about whose fitness or responsibility there is any doubt should never be employed on streets or private grounds. There are competent concerns who do thorough work and who take contracts in any part of the State, but everyone should learn the elementary principles of pruning in order to know when it is correctly done. "Tree Pruning" by A. Des Cars, translated from the French by Professor Charles S. Sargent, and "The Pruning Book" by Professor L. H. Bailey are the best available works on the subject. They are interesting as well as instructive even to one with no previous knowledge in such matters.

Country roadsides may be shaded and beautified with much less expense and trouble than city or village streets by taking advantage of that wealth of spontaneous growth which almost every roadside produces when let alone. In the indiscriminate mowing of roadsides which so generally prevails, many a fine seedling or sapling is cut down that would in a few years become a noble tree, a comfort and delight to every passer by. In cities and villages it is undesirable to use trees of different kinds on the same street or short section of a street, but on country roads a mingling of species is often very effective. Neither should trees always stand in rows or be evenly spaced, and occasional wide breaks in the line of shade on one side or the other of the road make pleasing contrasts, especially when disclosing broad or distant views. The natural roadside tree growth can often, therefore, be utilized to a large extent with very little additional planting. Trees of any size often do not need guarding unless in exposed positions and many trees can be guarded by bushes, or by inexpensive improvised wooden guards large enough so that stakes driven into the ground will not injure the roots of young trees. Such guards — as also fences and walls — can be disguised and beautified by vines and other plants. Roadside trees even more than street trees should usually be trimmed high, not only for the admission of light and air and convenience of passage, as in the case of loads of hay, but also to afford unobstructed views of the surrounding landscape. Mr. Morton, besides his cultivation of woodland, is devoting considerable time and thought to directing and improving the natural tree growth upon highways adjoin-

ing his land and that of others interested in his operations, which promise great success.

Other roadside growth should receive the same thoughtful artistic treatment as Mr. Morton is giving to trees, and this can be done at the expense of less time and trouble than trees require. The endless groupings and combinations of nature are varied and graceful beyond any possibilities of artificial arrangement and can be altered or modified and mistakes repaired almost at will, owing to the rapidity of roadside shrub and plant growth. We have doubtless all had the experience on our visits to the country of driving or walking a long way for the sake of enjoying a certain "pretty road," and of avoiding another walk or drive because of barren, ugly roads. But why have any roads ugly or barren? Why not make them all beautiful or let them become so, not with tiresome sameness —though which is worse, monotonous beauty, if there is such a thing, or monotonous ugliness?— but with Nature's own graceful profusion and variety, restrained, interrupted, modified, if you will, by the hand of man, but always fresh and pleasing.

Iu speaking to the Horticultural Society last year I mentioned reasons that had been given me for opposition to tree and shrub growth upon country roadsides. The chief of these reasons was that such growth, especially bushes, causes snow drifting. After a somewhat extended investigation, I find that with very few exceptions all the bad drifting places are on barren open pieces of road where there is no roadside growth at all. When drifting does occur habitually between overgrown roadsides it seems usually to be on roads running north and south, while east and west roads presenting apparently the same conditions in other respects do not drift at all, and it is by no means certain that the north and south roads would not drift just the same or worse with the bushes all cut off. Pines and other evergreens are greatly complained of as roadside trees because of keeping the road icy, unsettled, and muddy late in the spring. But here again it appears to be wholly a matter of location. Pines on the north side of a road protect from cold winds and retain the heat of the south sun, thus causing mud and ice to disappear more rapidly than elsewhere, while on the south side they keep off the sun and let in the wind producing exactly the opposite effect. The result in either case is modified

by high trimming, which is almost always advisable except in the case of certain evergreens, and occasionally other trees, in some location where a hedge-like effect is desired. Nothing in roadside adornment produces a more stately and magnificent appearance than a long row of tall, well spaced, and high trimmed Pines. They grow easily and quickly and should be used much oftener than at present. Nut trees also, both on streets and roadsides and in orchards, are deserving of much more attention than they now receive, and the objections to their cultivation or toleration can be far better met than by cutting down beautiful and valuable trees. I notice in the "Old Farmer's Almanac" for 1900 some excellent advice on "Growing Chestnuts and Shellbarks for the Market;" also suggestions for "Trees and Shrubs around the Dwelling House."

There is happily in Massachusetts a growing sentiment in favor of utilizing natural roadside growth instead of mowing it down, but the work of Village Improvement Societies has thus far seemed to be confined almost wholly to village limits. In fact it is not uncommon to find large portions of a road between two beautiful and well-kept villages not only robbed of every natural charm but even disfigured. If these organizations would take hold of country roads with the same zeal and judgment that they have in many cases applied to the improvement of streets, a few years would see a vast increase in the rural attractions of our State.

The work of educating public opinion on the subject of a more healthy and beautiful street and roadside growth is one to which women's clubs seem particularly adapted, always providing that they act as does the Roxburghe Club, only upon thorough knowledge and in hearty coöperation with street commissioners, tree wardens, and other officials. Most women have more daytime leisure than most men to observe the condition of streets and roadsides, and their organization into clubs gives them greater influence and better facilities for systematic study than they would usually gain as individuals.

Another and the most powerful agency for improving the present state of things lies in the training of children and youth. Not that I would add one iota to the already over-full curriculum of our schools. I would make room by taking out those subjects

like mathematics—beyond the simplest elements—valuable in themselves and in their proper place, but now crowded prematurely upon the primary and grammar grades, and by abolishing methods such as waste so much time, for instance, in the present study of English. Nature study is a long step in advance, especially when it includes gardening. But why not go farther and take up the elements of arboriculture and forestry, and do it in the most concrete and practical manner? No amount of abstract teaching can half so well fix upon the minds of children the circulation and functions of sap, for example, as to see it illustrated in good and bad pruning. As soon as they are old enough, let them take a hand themselves at pruning in a small way as part of manual training. Set them also to observing the defects and possibilities of street and roadside trees and other growth in their neighborhood, and they will prove themselves most valuable investigators and helpers as they have already done in some places by collecting and destroying the egg clusters of the tent caterpillar and other insect pests. Take them to the nearest available woodland for illustration of timber growth and forest functions. Educate the children on proper lines and we shall not have to cut down nut trees to save them from mutilation. Let children become interested under suitable direction in street and roadside, in timber raising and forest preservation, and the next generation will live in a better and more beautiful world than ours. Besides, I believe that early training in such far-reaching work as tree culture and forest management has a distinct value in broadening and humanizing mind and character. Familiarity with aims and efforts for definite, practical future good which must often benefit others rather than one's self cannot fail to have that effect. So let us devise some plan for training our children whereby they can work together with nature in her free and open laboratories, study her methods and feel the pleasure of assisting in their development, with an eye like hers—if unconsciously, perhaps so much the better for a while — an eye to future men and future times.

BUSINESS MEETING.

SATURDAY, March 3, 1900.

An adjourned meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

Ex-President William C. Strong spoke of the exhibition of carnations, open at the Flower Market under Park Street Church, and of the desirability that so beautiful an exhibition should be held in Horticultural Hall, and moved the appointment of a committee of three to confer with the organization under whose auspices the exhibition was held, in regard to bringing the next exhibition to the Society's Hall. The motion was carried, and the Chair appointed as the Committee Mr. Strong, William H. Spooner, and Patrick Norton.

Henry L. Clapp made the following motion:

That half-tone cuts, not wider than the pages of the TRANSACTIONS, be made from photographs of President Francis H. Appleton, Vice-President Benjamin P. Ware, Secretary and Librarian Robert Manning, Ex-Presidents William C. Strong and William H. Spooner, Joseph H. Woodford, O. B. Hadwen, and Mrs. E. M. Gill, all members and pillars of the Society, and that our TRANSACTIONS this year be embellished with prints from such cuts: and further, that a short account of the principal incidents and works in the lives of these members be printed with the pictures in our TRANSACTIONS, and that additions be made to the accounts according to the discretion of Secretary Manning, who knows all the members well.

The above motion was referred to the Executive Committee.

The following named persons, having been recommended by the Executive Committee as members of the Society, were on ballot duly elected:

HENRY BROOKS, of Lincoln.
JAMES DONALDSON, of Boston.
FERNALD E. HAM, of Burlington.
FRANKLIN HAVEN, of Boston.
WILLIAM W. HOLT, of Winchester.
THOMAS ROLAND, of Nahant.

The meeting was then dissolved.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 10, 1900.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The following lecture illustrated with stereopticon pictures, some of which, selected by Mr. Ward, are reproduced here, was delivered:

THE IMPROVEMENT OF CARNATIONS IN AMERICA.

By C. W. WARD, Queens, N. Y.

Our Carnation, *Dianthus Caryophyllus*, erroneously called Pink by many people, is a native of Southern Europe. In its original state it is a half-hardy herbaceous perennial, growing about two feet in height. The original flower was flesh colored and contained five broad petals. Its natural period of blooming in the open air is from June to August. It is said to exist in the wild state in England where it was introduced supposedly about the time of the Roman invasion. As long ago as three hundred years B. C. the Carnation was described by Theophrastus, who gave it the name Dianthus, from the Greek *Dios*, divine, and *Anthos*, flower. The name Caryophyllus was undoubtedly taken from the clove tree, *Caryophyllus aromaticus*, and was applied to the Carnation because of the clove-like fragrance of its blooms. The name Carnation, derived from the Latin *carnis*, flesh, refers to the flesh-colored flowers of the original type. The Carnation has been in cultivation for more than two thousand years, and in early Greek history is mentioned under the name of Gillyflower. As early as the beginning of the sixteenth century the development of the Carnation began to attract the notice of historians, and the European gardeners contributed so many varieties that Gerard in 1597 wrote that to "describe each new variety of Carnation were to roll Sisyphus' stone or number the sands."

The Carnation has been divided into several distinct classifications. The French arranged all varieties in three classes, the Grenadins, Flamands, and Fancies. The English divided them into four classes: Selfs, comprising only one color in the petals; Flakes, having a pure ground of white or yellow and flaked or

striped with one color; Bizarres, having a pure ground color but marked with two or three different colors; and Picotees, the last, having a pure white or yellow ground, each petal being bordered with a band of yellow at the margin. The English still maintain this classification and in the twenty-second annual report of the National Carnation and Picotee Society, Southern Section, of England, we find a total of forty-two classes described in their premium list, covering the above four classifications.

In the early part of the nineteenth century the English gardeners paid particular attention to growing Carnations and produced fully as large flowers as any that we have upon the table here today. They practised what is known among English gardeners as dressing, removing all imperfect and superfluous petals with forceps and arranging the remaining petals in a perfectly formal manner. Frequently the calyx was cut down between the points to prevent what is known as bursting; that is, the growing out of the petals at one side of the calyx. All of these artificial details seem to have proved of doubtful benefit to the Carnation, and eventually to have wrought its downfall, as we find that from about the middle of the nineteenth century little is heard of the Carnation among English gardeners, until within a comparatively recent period. The type of the Carnation, however, that was developed and grown by the English gardeners, is not the same type that we grow at the present time; but it is distinctly a race of summer flowering Carnations. The usual plan of growing them is to keep the plants in cool houses or cold frames during the winter and to bring them into blooming quarters in the early spring. They were usually had in perfection during the months of July and August, each plant producing a profusion of blossoms during this short season. While the English seem to have lost much of their interest in the Carnation about 1850, that interest seems to have been steadily reviving during the past few years.

Referring again to the annual report of the National Carnation and Picotee Society, we find that there is a total of three hundred and nineteen premiums offered in the forty-two classes and that this society is supported by a list of three hundred and eighty subscribers, who have donated sums ranging from five shillings to fifty pounds each towards maintaining its premium list, these donations amounting to three hundred and seventeen pounds

sterling, or about $1,500. We also find that this report contains as patronesses the names of Lady Ardilaun, Baroness Burdett-Coutts, the Duchess of Marlborough; and as patrons, Lord Balfour, Lord Henry Grosvenor, Lord Rothschild, and Baron Schroeder, and many other prominent persons. Among its Vice-Presidents is found Sir John T. D. Llewelyn, member of Parliament. The mention of these names will give some idea of the present interest shown by English people in Carnation culture.

In America we have also the American Carnation Society, a national body devoted to the improvement of the Divine flower. This Society is composed of a membership of upwards of three hundred, the majority of whom are either Carnation enthusiasts or engaged in the cultivation of the Carnation either commercially or as amateurs. The work of this Society has been of incalculable benefit, and to its efforts may be largely attributed the advancement which has been made in the American Carnation. This Society holds its annual meeting in February of each year at different points throughout the United States, upon which occasions are exhibited magnificent displays of the finest Carnations that can be grown. The membership of this Society is open to any and all persons who are interested in or have any love for the Carnation. None are barred—amateurs and professionals are equally welcome.

The Carnation commonly grown in America was derived from the French strain, known as the remontant, monthly, or perpetual flowering Carnation. This distinct race originated about 1840 and is said to have been produced by M. Dalmais, a gardener of Lyons, France, the original variety, called Atim, having been sent out about the year 1844. This improvement was followed up in 1846 by M. Schmitt of Lyons, who produced several fine varieties that remained in cultivation a number of years.

M. Alphonse Alegatière was the next horticulturist to aid in the material development of this new race of Carnations, and he succeeded by skillful crossing in obtaining fine varieties with stiff stems. In 1860 the number of these varieties was largely increased and this class received the name of Tree Carnations; but in America they were generally termed monthly Carnations. It is from the productions of Alegatière that our American race of Carnations was undoubtedly obtained.

As early as 1866 a number of varieties were imported into this

country by Messrs. Dailledouze and Zeller, horticulturists, who were then located in Flatbush, L. I., — these gentlemen having imported Edwardsii, President Degraw, La Purité and a variegated La Purité. These varieties were grown during a period of ten years as pot plants for summer and winter blooming. It may be of interest to state that at the present time Mr. Charles Zeller, the survivor of the firm of Dailledouze & Zeller, still lives in Flatbush, a hale and hearty gentleman upwards of eighty years of age, and it has been my pleasure to hear him frequently declare that he was more than proud to have been one of the first who brought the Carnation to this country.

Mr. Zeller's partner, Mr. John Dailledouze, has long since passed away; but has left worthy sons who have succeeded to and preserved their father's love for the Carnation.

The work of improving the American Carnation has been taken up and carried on successfully by such men as the late Charles T. Starr and W. R. Shellmire of Avondale, Pa.; William Swayne of Kennett Square, Pa.; Joseph Tailby of Wellesley, Mass.; Sewall Fisher of Framingham, Mass.; Fred Dorner of Lafayette, Ind.; Fred Witterstaetter of Cincinnati, O.; Peter Fisher of Ellis, Mass.; the Dailledouze Brothers of Flatbush, L. I., and many others whose names are not now at my command.

The foregoing historical account of the Carnation I have gathered largely from the Cyclopedia of American Horticulture recently published by Professor L. H. Bailey of Cornell University.

Today it is my purpose to give you an illustration of the development of the Carnation from the original five petaled bloom to the four-inch flower of the present date. We find from the ancient descriptions that the wild Carnation was a five petaled flower about one inch in diameter and that it was commonly flesh or lavender colored. Fortunately among hybrid seedlings of today frequent reversions furnish us with flowers that are almost identical with the original type as it existed two thousand years ago, save perhaps in the matter of color.

In plate 1, figure 1, we have the original five petaled flower, but the color is a deep crimson. In figure 2 we have the first step towards the improvement of the flower, this being the addition of a single petal, producing a six petaled bloom. The next step is shown in No. 3, where three or four small, short petals have been added

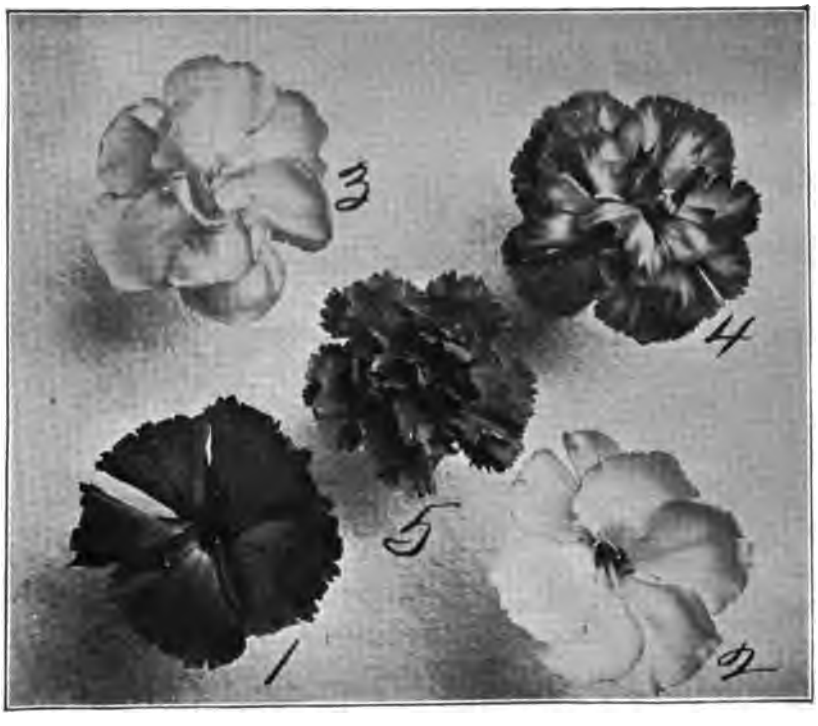

PLATE 1.

Evolution of the Carnation
from a single to a double flower.

to the centre of the bloom, producing a semi-double flower. In the next step, No. 4, still more petals have been added and we now have a fairly double flower. The fourth step was made by adding still more petals, making a full, double flower as shown in figure 5; but you will notice that in all of these the relative size of the bloom remains the same, namely, about one inch in diameter.

After the Carnation hybridizer had succeeded in producing the double bloom shown in figure 5, his next aim was to increase the size of the bloom, improve the strength, as well as elongate the stem, and improve and diversify the shades of color. This has all been so faithfully done by our American hybridizers that you now have before you these magnificent blooms measuring from three to four inches in diameter with perfect calyxes and supported upon stiff stems two feet or more in length; some of them being equal in form to those produced by the artificial manipulation of the English dresser; embracing almost every tint of color known in flowers, save that of blue, and the approach towards this latter color is shown in varying shades of purple; several California varieties have been introduced in a distinct shade of mauve.

The study of this plate is decidedly interesting, as it shows the comparative difference between the Carnation as we know it today, and the original flower that aroused the sentiment and admiration of the ancient Greeks and Romans. This comparison is accentuated when we throw upon the screen Governor Roosevelt, a seedling four inches in diameter as the photographs from which these slides were made were taken of the same relative size. We shall also find in this bunch of seedlings before us a number of these single petaled blooms.

Possibly a brief description of the process of hybridizing may be of interest. If you will note figure 1 in the plate now thrown upon the screen, you will see projecting above the flower which has been split down, two horn-like growths. These are the pistils or female organs of the flower. In figure 2, where the petals and pistils have been removed, you will note the anthers which contain the pollen. In hybridizing, this pollen is removed from one flower and spread upon the pistils of the flower which we wish to bear the seed. This is done by tweezers or a camel's hair

brush, and in some instances by simply taking the flower and scattering the pollen over the pistils.

In figure 4 you will note that the flower has commenced to wither and the petals are closing together. This is an indication that fertilization has taken place.

Figure 5, where the calyx has been removed, shows the ovary or seed pod commencing to enlarge. After fertilization has taken place this pod continues its growth for four or five weeks and usually ripens its seed within six or eight weeks after the date of fertilization. Seed ripening, however, takes place much more rapidly in April, May, and June than during the winter months. After the seeds are ripened they are carefully sown and treated the same as the seeds of any choice greenhouse plant.

Again referring to figure 1 on the next plate, we have the seedlings shown immediately after the seed has germinated. You will notice that the embryo plant has scarcely any root, there being a slight suggestion of a root fiber; while in figure 2, which is taken three days after germination, the root system is distinctly shown.

In figure 3, taken a week or ten days after germination, the root system has reached considerable proportions and the first true leaves are beginning to form. When the seedlings reach the stage shown in figure 3 they are taken from the seed beds and pricked off into flats, where they remain three or four weeks and are then potted up in small pots, from which they are planted in the open ground from about the first to the tenth of May, where they come into bloom during the months of August and September, at which time the plants bearing promising flowers are lifted and planted on the greenhouse benches, and thereafter treated the same as in ordinary Carnation culture.

While this growing of seedling Carnations is an intensely interesting work and one well worthy of the careful attention requisite to obtain valuable results, it is not only tedious but expensive; and the seedling grower who produces a distinct advance upon the existing type of Carnation is well worthy of the plaudits of his fellow Carnation men and richly deserves the praise of all those who are interested in or imbued with the love of flowers.

In order to give an idea of the relative size, form, and build of the Carnations that have interested the American grower during

PLATE No. 15.

An Ideal White Carnation.

PLATE No. 16.

Ideal White Carnation.

Side View.

the past ten years, we will now pass upon the screen a number of varieties, giving you the name of each variety as it is shown.

The first is William Scott, introduced in 1893, and still largely grown.

The second, Storm King, a beautitul white, introduced in 1895, but now almost obsolete.

The third, Mrs. George M. Bradt, was introduced in 1896; this is the largest and most striking variegated Carnation to date, and and is more generally grown than any other of its class. It, however, has several rivals, among them being Olympia, which you see in the vase upon the table.

The fourth is Bridesmaid, which was introduced in 1897, but which has practically passed out of existence.

In the next run of plates we will show front and calyx views of the blooms, in order to give you an idea of various forms of Carnations. These views are of flowers of comparatively recent origination.

In plates Nos. 15 and 16 we have a snow-white seedling which for beauty of form and purity of color was unsurpassed, but unfortunately it was not sufficiently free in blooming to warrant its commercial introduction. In the front view of the flower the petals are not crowded, but there are sufficient of them to give the effect of a shapely, symmetrical bloom, and in the side view of the flower you will note that the guard petals are broad and stand out flat from the calyx without recurving, while the centre of the flower is well built up and the calyx and stem are proportionately strong.

In Nos. 17 and 18, we have White Cloud, one of the prominent commercial whites of the present time. This is a very full flower, possessing a good calyx, but is rather too full for the ideal flower.

In Nos. 19 and 20 we have a fancy flaked variety, a seedling of 1898. The ground color is yellow and the petals are heavily striped and edged with a pinkish scarlet. You will note that this flower is very symmetrical, that the calyx is perfect, and the guard petals are broad and stand out perpendicularly from the calyx without any tendency to recurve. This flower is exceptionally well formed and may well prove the forerunner of a splendid class of fancy varieties.

In Nos. 21 and 22 we have a huge lemon yellow bloom of the Malmaison type, which produces a flower nearly four inches in diameter. Unfortunately it persists in bursting its calyx under ordinary culture. This bloom you will find in the vase of seedlings.

In plates Nos. 23 and 24 we have another fancy variegated yellow, which shows an excellent form and calyx.

In plates Nos. 27 and 28 we have Governor Roosevelt, a seedling of 1897, which is particularly distinguished by its symmetrical form, large size, splendid calyx, and excellent stem. This variety is probably the most advanced step in the development of the Carnation yet achieved. The flowers reach three and one-half — even four inches in diameter, with stems from two to three feet in length.

In plates Nos. 29 and 30 we have quite a new departure in Carnation seedlings. This is what we may term an Anemone flowered Carnation. You will notice that this flower is composed of a single row of broad guard petals that stand out well from the calyx. Around this is a thick bunchy wreath of fine feathery petals, the same as is seen in the Anemone flowered Chrysanthemums. In the centre of this bloom are six miniature flowers, the largest of the secondary flowers being surrounded by the five smaller. This flower also has four pistils instead of two, and probably if it had been left to develop, some of the secondary flowers might have developed additional pistils. The flower was nearly four inches in diameter and is the most remarkable freak that I have seen among Carnation seedlings, but unfortunately we cannot proceed further in hybridizing with this variety, as it produces neither seeds nor pollen.

Plate No. 31 shows a vase of a seedling which was at first termed No. 666, but is now named Prosperity. This is in some respects the most remarkable Carnation originated to date. The blooms attain a size of from four to four and one-half inches and are borne upon good stems and possess fine calyxes. This is distinctively a fancy Carnation, the ground color being white and the petal being suffused or flaked with crimson pink.

Our next series of views will be for the purpose of illustrating the calyx of the Carnation.

In plate No. 32 we have what is known as a burst calyx. You will note that the flower has grown entirely out of one side of the

PLATE No. 27.

Carnation Gov. Roosevelt.

Front View.

PLATE No. 28.

Carnation Gov. Roosevelt.

Calyx View.

PLATE No. 29.

Anemone Flowered Carnation.

calyx and torn it, so that it is quite out of shape. There is upon the table a vase of burst flowers which will probably give you a better idea than you can get from the picture on the screen.

Plate No. 36 is General Maceo. This has an excellent calyx. A vase of this variety is also upon the table and may be examined at your leisure.

Our next series of views will show interior and exterior views of modern Carnation houses.

Plate No. 40 shows a house of Alaska, a white seedling which we were growing in 1896.

Plate No. 47, a bench of William Scott as grown in 1894.

Plate No. 49, a bench of Governor Roosevelt growing the present season.

Plate No. 52 shows Carnations as they are stored in a cool room preparatory to being shipped to market. This room contained at the time five thousand flowers, this being the day's product cut from ten large houses comprising some thirty thousand feet of glass.

I am asked sometimes why Carnations purchased from the stores frequently keep but a few days, and I am oftentimes requested to give instructions as to how to care for Carnation blooms. In my opinion, the reason for Carnations not keeping after they have passed through the commission houses and stores, arises from the variety of improper treatment which they receive. I have many times seen dealers take Carnations from the box as they arrive and plunge the stems immediately into ice-cold water and set the flowers into a cold ice-box. I think that this alternate chilling and heating of flowers, as by plunging the stems in ice water and chilling the flowers and then placing them in highly heated dry rooms, is the reason for the premature withering away of the Carnation flowers.

You will understand that a flower immediately after being severed from the plant is in a delicate condition. We all know that if we subject our plants in the greenhouses to these sudden changes in temperature, such as chilling them and again overheating them, the plants eventually fade and die. This is especially the case with a member of the plant that has been severed, such as the cut flowers.

The treatment that I would recommend in order to keep Carna-

tions as long as possible, is to plunge the stems in water from which the chill has been taken so that it feels just slightly warm to the hand. Then place the vase of flowers in a room not colder than from forty-five to fifty degrees Fahrenheit and allow the flowers and water to cool down with the room. Treated in this way we keep Carnations from two to three weeks, and in some instances have kept some varieties four and five weeks. If the blooms are kept in a room ranging at from forty to fifty degrees during the nighttime they may be brought into the living room where the temperature is quite high during the daytime, and returned to the cool room each night without serious injury. Treated in this way Carnation blooms should last from seven to twelve days and even longer.

I have found an unoccupied bedroom on the north side of a house in which there is no direct heat, or at least very little heat, the temperature ranging from forty-five to fifty-five degrees, an excellent place in which to keep Carnation blooms. It is in this kind of a room that we are able to keep the Carnations from two to three weeks and even longer, as I have before said.

Our next series of plates will show a few attempts at artistic arrangement of Carnation blooms.

Plate No. 53 is a corner table arrangement in which about three hundred flowers are used.

After listening to this technical description of the advanced improvement in Carnation culture, a few statistics concerning the magnitude of the business, the value of the product sold, the capital invested and the persons employed, may not come amiss. It is impossible at the present time to make correct statements regarding the amount of capital employed, as we have as yet no accurate statistics. From a rough computation I am inclined to think that there are, perhaps, two millions of dollars invested in Carnation growing in the United States today, and that there are probably employed in the production of Carnation flowers, something like five thousand, possibly more, people; these employees receiving wages ranging from $35 to $100 per month, the average wages probably being $45 per month.

It is still more difficult to arrive at the value of the crop produced; but basing our estimate upon the retail prices, the probable value of blooms and plants sold should be from three to four

times the capital invested. There are about two and one-half millions of young Carnation plants and rooted cuttings sold each year, and florists produce an equal amount which they themselves use for growing and which are not sold; so that the entire production of rooted cuttings and young Carnation plants will approximate five millions per annum. Of these plants at least four-fifths are grown under glass during the winter time for cut-flower purposes, some three to four million plants per annum being used for this purpose. Assuming that they produce an annual average of twenty flowers to the plant would give sixty millions of blooms produced upon the American Continent each year.

What becomes of this enormous number of flowers is somewhat of a mystery. They are put to innumerable uses. The Carnation is a flower that awakens the love of almost every person, and as the average Carnation blooms are sold at much more reasonable prices than many other flowers, they come within the reach of a larger class of people than do roses and orchids; consequently the consumption is larger. There is no use to which flowers can be put for which the Carnation is not fitted. It lends itself to almost every scheme of decoration. Its delicious, clean, pungent, aromatic fragrance admits it to almost every sick room; it is unsurpassed for dinner or centre-table decorations; it is universally used in the making up of set pieces; it is also one of the best flowers for boutonnières that the florist has at his command; and finally, its wide range of pleasing colors, its lasting qualities and fresh, rich, clove fragrance combine to make it one of the most popular, as well as one of the most sought for and profitable of florist's flowers.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 17, 1900.

A meeting for Lecture and Discussion was holden today at eleven o'clock, Vice-President, BENJAMIN P. WARE, presiding.

The following lecture was delivered:

Japanese Plums.

By George S. Butler, Cromwell, Conn.

About thirty years ago a California gentleman secured several plum trees from Japan through one of our Consuls (Mr. Bridges), at a cost of ten dollars each. These trees passed into the hands of John Kelsey, of Berkeley, California. When they began to produce fruit, in 1876, Mr. Kelsey became convinced of the value of the plum for general commercial cultivation, and it was placed with an Oakland nursery for propagation on a large scale, and named in honor of Mr. Kelsey.

The Kelsey not proving hardy in the North and East, the Japan Plum was condemned as not worthy of trial here, making the introduction of other varieties in this section very slow indeed.

Subsequently other parties, particularly Luther Burbank, of Santa Rosa, California, made other importations of Japanese Plums, and these varieties have been widely disseminated over the United States and Canada, and contrary to the opinions founded on the behavior of the Kelsey, have proved to be adapted to a wide range of territory.

These plums are now classed botanically as *Prunus triflora*, from the fact that usually three flowers come from each bud, but they are easily cross-fertilized with *domestica*, *Chicasa*, *Americana*, and *Simonii*. We are beginning to have many of these crosses which are hard to locate, but as most of us are more interested in producing fruit to tickle the consumer's palate, and touch his pocket book, than in the abstract science of botany, we shall probably not be worried if our professors have to earn their salaries, guessing at where some violent cross ought to settle down and behave itself.

For the past decade, interest in the Japan Plum has steadily and rapidly increased and although many of them are inferior in quality to some of our European or *domestica* varieties, their great beauty, freedom from disease, ability to resist the attack of the curculio, and heavy cropping qualities, have brought them into favor with growers, and some are proving of fair eating quality and superb for canning or preserving.

Nearly all the Japan Plums are vigorous growers with long forked branches, the fruit buds setting in great clusters, instead of singly and in pairs as in the European varieties, and when in bloom we often have all the branches completely hidden.

But these plums are much more nearly allied to our native plums of the Wild Goose type than to the European, and this similarity is a strong point in their favor, for we may reasonably argue that similarity of environment has produced similarity of attributes, and we know that the eastern Asian country is furnishing us many other valuable plants. The North China type of peach, today we are all turning to for our improved varieties and with great and reasonable hope of success.

Doubtless our American plum of the future will be based on the *Americana* species (although today but the child of the forest), crossed with this Japan type, so similar in tree but centuries in advance in fruit, with possibly the admixture of the European for quality and *Simonii* for — some other reason — if any, probably curiosity.

Most of our importations of Japan plums have been introduced under the names of Botan, Sweet Botan, Sumomo, Shiro, Wasse, Botankio, Hattankio, Satsuma, Yone · Momo, Nagate, or some combination or corruption of these names. These names refer to classes, not varieties, of plums. For instance, the Sumomos are early round plums like Willard, Ogon, Yosobe, etc., although Professor Tamari, of Tokio, says Sumomo means "Plum" and Wasse means "early." Some of the other words have as many meanings and as diverse as some of our English words, and most of the trees and scions imported seem to have been thoroughly shuffled and then labelled to suit the desires of the purchaser. For instance, we have the Chabot — first imported by Mr. Chabot, of California, and introduced under that name in 1886, by Luther Burbank — under eight other names, four of them Japanese and four American. No doubt this plum is entitled to all the good names placed at its disposal in the past twenty years, but it will require some agreement on the part of nurserymen to get rid of the eight tails to its name, with the possibility of another nurseryman's discovering its good qualities every other year as in the past, and introducing it under a new name to be ferreted out and laid aside in turn.

The Georgeson has been sent out under five different names and all from the same party, while the little Red June, even, rejoices in three.

Thus we see how easy it is to multiply varieties on American soil, but I am glad to say there is a determination on the part of our best nurserymen, our Experiment Stations, and the American Pomological Society to do away, as far as possible, with the confusion of Wasses, Sumomos, etc., and the duplication of varieties.

The culture of this fruit is hardly a subject to occupy much time in a paper of this kind, for it is a matter of almost universal knowledge today that the best crops of any fruit are only secured by constant and thorough tillage with tools best adapted to the land in one's possession. We use the gang plow, extension head cutaway, Acme smoothing harrow and weeder; if the land is very stony the spring-tooth harrow would probably be the only one used.

Set first-class trees. Many orchardists save a few cents on a tree by buying light grade trees. Granting that the trees are first class, but young, the entire saving would not more than pay the interest on the value of an acre of good land, not to mention the cost of a year's cultivation; but if the stock is the same age but inferior in quality, as is usually the case, the weakness is liable to be always manifest. If the tree only develops to a cull in the favorable conditions of the nursery, the chances are that it will die a cull in the orchard.

The first season the tree will make nearly as much growth as the peach under favorable environment, and should be treated in much the same way; thinned, to start the form desired, and headed in sharply during the dormant season. The following season, the roots having a firm hold to start with, the growth will be quite heavy if cultivated, fertilized, and trimmed thoroughly, and this growth should be heroically cut back. The following season the orchard or tree should begin to fruit, and with fruitage the tree growth will be somewhat curtailed, but we find severe pruning advantageous even in our old orchards, saving thinning of fruit by hand and placing the crop where the tree can carry it more easily.

The propensity to overbear must be continually guarded against, as the quality of the plums on an overloaded tree is very inferior,

and having neither quality nor size, it is difficult to get our city friends to part with much of their good money in exchange for them. If two-thirds of the bearing wood is trimmed off from the tree and the plums which set on the remainder are thinned to about four inches apart, we shall have on a mature tree, from one to two bushels of plums, from two to two and a half inches in diameter, and as attractive as they are large. California never shipped to New England as large, handsome, or good quality plums as we have placed upon our markets the past four years. But I have seen the same varieties sent here from Michigan, yes, and grown in Connecticut too, that proclaimed the doctrine of sixteen to one more loudly than William Jennings Bryan or George Fred Williams were ever able to, even when they got their second wind. That is, there were sixteen times as many stones in each basket, sixteen times as much plant food sucked from the soil, sixteen times nearer a drained dead tree, the flesh over the stone a sixteenth of an inch thick, and as interesting to eat as sixteen corks which have never held the mouth of a bottle shut. These plums were bought by sixteen sons of Abraham, who yelled themselves hoarse trying to sell them for sixteen cents a peck. The other plums sold themselves in fancy groceries and fruit stores at $1.25 per peck. There is nothing overdrawn in this comparison, except the Sheeneys' selling price, which I have known to drop to ten cents per peck.

The rot (*Monilia fructigena*) is the most troublesome enemy of the Japan Plum — unless it be its own tendency to overbear — but this disease is no more serious than on the Domestica varieties, if as bad. Eternal vigilance is the price of plums (as well as of anything else worth having), and we have made it our practice to have some trusty men practically live in the orchard after the first of June, going over the trees systematically, thinning out imperfect and superfluous plums, and always having an eye for the rot, which is "carried forth without the camp" — being more contagious than leprosy — and either burned or buried in a deep, deep hole. Beside picking off the mummified plums we shall, this month, apply a strong copper sulphate spray (ten pounds to a barrel of water) and Bordeaux mixture, before the buds open, but shall not experiment very heavily on the trees with any spray after

leaves appear, being perfectly willing to let some one else furnish the bulk of the experience on that line.

From sources of undoubted authority I learn that the disease known as "Yellows" in the peach thrives on the Japan plum, although I have never seen a tree which I felt I could declare a bona fide case of "Yellows;" if I did I should surely treat it as I would the same disease in the peach.

We have lost from one to two per cent of our trees from unknown causes, each season, and after laying it to winterkilling, grubs, and various other causes, have about decided that the disease should be known as "Oriental cussedness," as we notice some of the Japanese ornamentals occasionally dying in the same way without the slightest provocation.

Black knot makes but very little headway on the Japan Plum. We easily cut off all the limbs attacked during the winter pruning and have made no attempt to watch for it, as we have to on some European varieties. I doubt whether one tree in a hundred in our orchards has ever had a knot on it.

The curculio finds more than he can eat, or spoil, and, in fact, although he gets in his work, the scar on the skin is about the only evidence of his labors, as very few of the eggs ever hatch.

Another great enemy of the Japan plum has been the nurseryman who persists in introducing new and wonderful varieties, like the Berckmans, which is little better than none at all, or the Willard, which is hardly as good, or the Kerr, which might as appropriately have been named "Yellow Dog."

Having thus briefly described a few varieties it might be well to enter into the characteristics of the others which are known.

Earliest of All, also known as Yosobe and Wasse Sumomo, is a very early—July 10 to 15—light red plum with yellow, soft, sour, and bitter flesh, clingstone, not salable in competition with Montmorency cherries.

Berger, also known as Strawberry, Uchi Beni Honsmomo, and Ura Beni, is in size and color about like the Earliest, but the flavor is quite distinct and better; it is a few days later. They drop from the tree when ripe, making picking very easy.

Lutts (Wasse-Botankio) is the best of its season, which is mid-July. If you can imagine a half-grown Burbank ripening a month ahead of time, you have it very closely.

Red June (Red Nagate, Nagate No Botankio) is of medium size, deep red skin, yellow flesh, clingstone, and of fair quality.

Ogon is a yellow plum, no worse than Willard in quality.

Maru ripens at about the same season as Abundance, but cannot compete with it in either size or quality, especially the latter.

Abundance is undoubtedly the best known of any of the Japan plums, and, all things considered, is the best eating plum we have when properly grown and thinned. A large, handsome fruit, rich cherry color when ripe, with a white bloom, highly perfumed, rich and juicy, flesh light yellow. When overripe it loses some of its fine quality. Tree a handsome upright grower and inclined to overbear. If good size and quality are desired it must be thinned vigorously. Season early August.

Burbank is a very large, handsome, and popular variety. Eight of these plums filled a quart mason jar, and we had specimens which would not pass through the opening in the top of such a jar. Our trees of this variety when loaded with ripe fruit presented the handsomest fruit picture it was ever our privilege to look upon. Canned with the skins on they produce a very rich looking liquor, but as the coloring matter is all in the skin, we produce an entirely different article, in color and flavor, by removing the skins before cooking; in fact, except for the clingstone, and the plum taste which lies near it, the pared fruit cooked, can hardly be distinguished from peaches. The tree is a rampant sprawling grower, very distinct and noticeable. Season closely following Abundance.

Hale produces more *wood* in a given time than any other plum we know of. We have also had specimens of the fruit and find them equal in quality to any plum in our orchard; about the size and color of Reine Claude and in season with the last of Burbank, from the middle to the last of August.

Georgeson, also known as White Kelsey, Mikado, Yeddo, and Normand seems to be the largest of the yellow-skinned Japan plums, and superior to all others of its color, except Hale, in quality. Tree a rather better grower than Burbank, but somewhat sprawling. Such fruit sells for about one-half the price of Burbank or Chabot, one of which may be had at the same time, and as it is not much superior in eating quality, I would not advise its propagation.

Wickson was introduced by Mr. Burbank as a Burbank-Kelsey cross, and thus a pure Japanese variety, but it is very evident that he was mistaken, and there can be no doubt from the character of its foliage, bloom, and fruit, its habit of growth, and method of bearing fruit, that it is a hybrid of Kelsey and Simonii. Fruit very large, long heart shaped with a deep suture; color, deep maroon-red, sometimes shaded lighter; pit small; flesh firm and meaty, yellow, rich, and aromatic, with a slight almond flavor; clingstone. The fruit favors Kelsey strongly, except in the color of the skin. Tree a narrow, upright grower, like Simonii. We have had but little fruit as yet, but hope another season with four-year old trees to be able to report good cropping qualities.

Chabot is also known as Bailey, Chase, Yellow Japan, Botankio, Hattankyo, O-Hattankio, Furugiyi, and Orient, and has even been sent out, I understand, for Uchi Beni, which it resembles about as closely as an Angora cat does a rhinoceros. This medium to large plum is, without doubt, all things considered, our most profitable market plum, coming the fore part of September when people begin to be willing to can and preserve plums. This plum will keep for weeks if necessary, and is the marketman's delight, as there is practically no loss. The tree is a strong upright grower, perfectly hardy, and very prolific, with handsome red and orange colored fruit; soft sweet yellow flesh, of good quality; clingstone. We have over two thousand trees of this variety in our orchards now, and shall continue to plant them until something better appears on the scene.

Satsuma (Blood Plum, Yone Momo) gives us very large fruit when properly thinned. Round-oblong with a blunt point and deep suture; color, dull brown-red mottled with greenish dots; flesh hard and blood-red. It seldom becomes edible with us, but for canning or preserving it has no equal. We have yet to learn of a single party who has once had the fruit who did not demand it in succeeding seasons. Our plums of this variety have retailed in the Hartford market for $5.00 per bushel. The tree is a strong grower, rather inclined to upright in form but still somewhat sprawling, and does not seem to come into bearing quite as young as some others.

DISCUSSION.

The lecturer said that carbo-sulphate spray, however weak, is injurious to Japanese plums when in leaf. He recommended the Abundance and Satsuma for private gardens. The Chabot comes at a good time for canning and is excellent for that purpose. The Satsuma and Chabot are very distinct; the former is of a rich red color, while the latter is yellow.

Joseph S. Chase said that Climax had not fruited this side of California. Mr. Burbank says it will revolutionize plum culture. The season of ripening seems to vary; the Hale varies in season. He would include the Burbank in a dozen varieties; it bears very young.

The Chairman said that there is now great competition in all farming operations, and that plum growing is well worthy of attention as a mercantile pursuit.

The lecturer said he had no doubt that the demand for Japanese plums will increase in the market. He thought that the more people have of these things the more they want. Over production occurs sometimes in all businesses, which may be a good thing. He thought we could not fill up Boston market for some time. Three years ago it was hard work to sell a wagon load of plums in Hartford in a day; now he can sell three.

Japanese plums will flourish wherever peaches will, and in a good many places where peaches will not. They are adapted to a much larger range of territory than peaches; they will flourish on a flat plain and on land where water stands. He had used bone and potash, but found no great occasion for potash. The winter of 1898 and 1899 was the severest known for generations, but plums bore full when the peach crop was entirely destroyed. Japanese plums naturally set fruit so heavily that it would be of no advantage to prune in summer for productiveness. He prunes at any time in the winter when it is not too cold. Much of the pruning is thinning out.

Hon. Aaron Low had set out plum trees in the chicken yard for shade. He jars the trees slightly and the curculios fall and the hens take care of them. He sold his plums for one dollar per peck. He advised those who have room in the hen yard to plant Japanese plums; some of the varieties are better than the Euro-

pean, and seem to be very desirable for planting, especially the Abundance and Burbank.

The Chairman thought that Japanese plums are not so subject to the curculio as the European varieties. He uses a padded mallet in destroying them; he strikes the trees, and as the curculios drop off the hens eat them.

A gentleman asked the lecturer whether the late spring frost is detrimental and also about his treatment for the curculio.

The Lecturer said in regard to the spring frost that two years ago when his Burbanks were in flower he had thought his plums ruined by frost, yet when harvest time came he had a good crop. As to the curculio, he had done nothing towards destroying it except incidentally to thinning and he simply picked off the wormy plums when harvesting. He thinks the curculio is not as troublesome to Japanese plums as to European. When the egg is laid on the Japanese plum the skin seems to dry back, leaving a scar, and that is the end of the egg. He thins so that the plums can grow as much as they want to without touching each other.

In answer to a question by Mr. Harrison, Mr. Butler said that he has had Japanese plums since 1889 and has had very little black knot. When pruning his trees he cuts off all black knot and burns it.

Mr. Chase said that he considers the Satsuma the best plum for preserving, and asked the lecturer what he thought of the Wickson for general cultivation. Mr. Butler was not prepared to recommend or reject the Wickson. Its fertility is not tested. It would not be so much work to thin it as to thin the Abundance. The Wickson bears on older wood. The Abundance is all gone before the Wickson comes in. He had been reckless enough to set out six or seven hundred in his orchard.

A gentleman said that he had seen Mr. Butler's plums in full fruiting and had never seen such a sight. He has, himself, a little plantation in Plymouth County, and in Essex County he has 12,500 plum trees, and has been very much encouraged because he has found all the obstacles that he had feared were mere moonshine. He had no winter frost, no spring frost, no black knot, and no curculio. He sold all his fruit at the orchard.

A vote of thanks to the lecturer was unanimously passed.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 24, 1900.

A meeting for Lecture and Discussion was holden today at eleven o'clock, Vice-President BENJAMIN P. WARE presiding. The following is an abstract of the lecture delivered. The Committee on Publication and Discussion regret that they are unable to present it in full, as Mr. Hale spoke without notes.

APPLE CULTURE FOR PROFIT.

By J. H. HALE, South Glastonbury, Conn.

The lecturer began by saying that he had received inspiration from the Massachusetts Horticultural Society in the cultivation of fruit, and was glad to come here and make return. For the first hundred or two years in the history of this country apples were cultivated mainly for cider. No bounty was ever offered for cider as there was for wine in Virginia, yet farmers would have forty, fifty, or a hundred barrels of cider. The apple is the most easily cultivated of all fruits, and therefore less pains have been taken with it than would otherwise have been. We have taken them as they come and have not attempted to bring them to perfection, because the apple is so good and kind to us and will give much good fruit even under great neglect.

New England, as regards soil and climate, is better suited to the apple than any other section of the country. We can grow apples of finer color, flavor, and texture, and longer keeping in New England than anywhere else. This was the lesson of the Chicago Exposition. All the different states gathered their choicest apples; there were beautiful apples from Michigan and the Ozark region of Missouri; from Oregon and the Snake river country of Idaho; from Western New York, and other so called favorable apple sections. As the apples melted away they were renewed from day to day from cold storage, but the cold storage house was burnt, and in a few days after that there were no apples except from the northeastern corner of the United States; these held up, many of them, from the middle of July till the middle of August

and into September, when the new crop of the same variety was ready to take their place on the exhibition table.

The first thing beyond soil and climate is to have good trees with perfect foliage from the beginning to the end of the season, but there is no such thing without spraying from two to four times a year. Frequent and thorough tillage of the soil is necessary, but many trees in New England are in sod land. This should be broken up whenever possible and good tillage take its place. In rough, rocky lands or steep hillsides where cultivation is not practicable, top dressing, mulching, harrowing, pasturing with sheep or hogs — some one or more of these should be practiced, according to local conditions. The trees must have room enough for air and sunlight. Like man they need circulation of air all round. The second thing is intelligent feeding; they need potash and phosphoric acid with a moderate amount of nitrogen. Fungous growths will attack even the best cared for trees, to some extent, so that spraying is essential. The fruit must be thinned, for the double purpose of securing fine perfect fruit and annual fruitage.

What can we do with our old orchards? They should be pruned, but for this you want a man of experience and knowledge of old trees. Coming here the lecturer saw men cutting right and left limbs from two to eight inches in diameter. New men go at this work with more zeal than knowledge. Cut out all dead wood and some small branches. Large limbs may be cut two or three feet out at any time when the trees are dormant, and then cut close in the growing time. Don't try to do it all in one year; take two or three years. Most old orchards are in sod, and if they are near the house, where you do not want to break it up, give it a heavy top-dressing of manure and harrow it. But if your orchard is to be devoted to apples only, plough it up—not too deep—and harrow in fertilizers. Scrape off the old rough bark and wash with Bordeaux mixture of double strength while the trees are dormant. Carry on the ordinary summer spraying for the codling moth, etc., and keep the ground broken up as long as you want good apples. If your land is too rocky or rough to plough, it may be mulched with any old material that is available—anything that will kill out the sod—but ploughing is better. Any grass that grows in the orchard should be allowed to die down to form a mulch, and eventually a fertilizer for the land. You may pasture swine or

sheep in your orchard if you wish. The lecturer knew a man who made an orchard of eight acres a pasture for hens—he had a thousand laying hens—and he is fifty per cent better off in yield and quality of apples than the former owner, who made the same orchard a hayfield. After cultivating an old orchard a year or two it will be necessary to thin out the fruit.

But the great hope lies in new orchards, which may be planted on poor land now growing up to bushes. There are thousands of acres of such land in New England, which if planted with late keeping red apples, will pay dividends two to one over railroads, insurance companies, etc.

A new orchard wants to be started on land as thoroughly prepared as for any other crop. Do not think you can grow two crops with only fertilizer enough for one. Some low growing cultivated crop may be grown the first four or five years, if fertilizer and culture enough are given for both. The orchard should be thoroughly cultivated through the growing season, beginning as soon as the buds begin to swell. Prune the trees by pinching in. Go over the trees three or four times during the summer, and pinch in every shoot that grows where you do not want it. If headed low, spraying and all other operations can be more easily performed.

The question of varieties is a local one, and yet it is not, for apples can be shipped to any part of the world, though there may be a local and special market for some varieties. Color catches the eye, but get as much flavor and high quality with it as you can.

In regard to distance, forty feet is near enough for some varieties, but the lecturer recommended setting twenty feet apart, and when the trees grow to touch each other, cutting out three-quarters. You will be tempted to leave them, but a business man should have courage to cut them at the proper time and not delay a single year after they begin to crowd. In this way three times as much fruit can be had in the first twenty years of the life of the orchard and after that the orchard will be just as strong as though originally planted forty feet apart.

The matter of feeding depends greatly on soils. The lecturer thought that there is a great deal of food locked up in Massachusetts soils; enough of potash and phosphoric acid could be made free and brought out by frequent and thorough tillage; the nitrogen you can get by ploughing in leguminous crops. The successful

horticulturist is the man who stirs the soil. Stirring the soil produces chemical action. Ploughing and harrowing are too hurried. Gen. John Bidwell, of California, had forty thousand acres of land which he ploughed hurriedly with gang plows and harrowed with a twenty-two feet sweep and got fifteen bushels of wheat per acre. A lady near by ploughed with modern steel plows and a pair of mules and harrowed two or three times with cutaway harrows, and got thirty-five bushels to the acre. Neither used any fertilizer. The man who is producing plants which grow quickly must have two or three times as much food in the soil as they need, so that it may be easily reached. Trees do not require their food so quickly available.

You cannot have good fruit without thinning. When young trees attempt to bear ten apples pick off eight and leave only two to come to perfection, and you will have two fine specimens. The next year pick off fifteen out of twenty; the third year pick off seventy-five out of a hundred. The talk of an "off year" is nonsense; trees can be educated into the habit of bearing every year. When the climatic conditions are such that the crop is killed, the next year the tree will be so full that it cannot ripen the fruit and at the same time form buds for the next year. By thinning out from seventy-five to eighty per cent every year you can bring the tree into the habit of annual bearing. If the tree is trained low you can thin the fruit much more easily. You must do it for fine fruit and greatest profit.

After the orchard is established comes the question of the time of picking. Watch the apples closely, and as soon as they come to maturity pick them, however early, even if it be August or September, and put them into cold storage. Place them at once in the packages they are to be sold in, but they should be graded —some will want two grades and some three—and packed honestly from top to bottom. As to packages the barrel is an abomination; in the first place it holds too much fruit and it is liable to heat inside. It can be rolled, and the effect on its contents may be like that of the founder's tumbling barrel on his castings. We want the largest package that we can tempt the consumer to buy. The lecturer recommended neat and attractive boxes, to hold a bushel each; a box twenty-two inches long, eleven and a half wide, and ten deep holds just a bushel. He showed

apples from such boxes which sold for two dollars per box by the car load, and Baldwins from a Massachusetts barrel, one from the top and a smaller one from eight inches down, which brought but two dollars per barrel. The man who raised them probably does not believe in spraying or thinning.

Three-quarters of all the apples in Boston Market are the abominable but good looking Ben Davis. The great market apple of America will open the pocket book, but you must have quality to keep it open. The Mann is a new, yellow, long-keeping, delicious variety. The Sutton Beauty has never been thoroughly appreciated; it is delicious. It is a red, long keeping apple, better every way than the Baldwin. The Gano is grown largely in the West; it produces a large proportion of perfect specimens quite a little better than Ben Davis; eighty or ninety per cent are equally good. Cooper's Market is grown largely in Pennsylvania. Damaged products sell for what people will give; this is the business rule the world over. We have been producing eighty-five per cent of damaged apples when we might have produced ninety-five per cent of perfect ones. Old methods of neglect cannot make apple culture profitable but under the best methods of culture, pruning, spraying, and thinning, it could be made the most profitable branch of agriculture.

Discussion.

The Chairman said that Mr. Hale had evidently been studying human nature as well as apple culture. He had planted apple trees twenty feet apart, intending to thin them, but they grew to be such beautiful trees that he had not the courage to cut them out.

He said that the lecturer was ready to reply to any questions that might be asked, and invited the audience to ask him the hardest questions they could.

Robert Manning said that he would ask the lecturer the hardest question he knew of connected with apple growing, and that was how to prevent injury to the fruit by the apple maggot or railroad worm (*Trypeta pomonella*), which is much worse than the codling moth, boring the fruit through and through till it is honeycombed.

Mr. Hale replied that nobody now knows how to destroy the apple maggot, but we may next year. It is the one thing connected

with apple culture that we do not know how to handle. The only thing to be done at present is to feed the infested apples to stock.

In answer to an inquiry how to shape trees, the lecturer said that he could not lay down a rule for all varieties, but would pinch constantly, having a central stem with a branch every foot if possible.

The success of cold storage depends largely on the temperature. Commercial cold storage is too cold; if kept down to freezing the apples lose flavor; from thirty-eight to forty-two degrees is cold enough. In a good cool dry cellar apples can be kept till spring. In large operations a tunnel like a wine vault in a side hill might be made valuable for storage.

In answer to a question as to the cost of caring for an orchard the first five years, the lecturer said that it depended largely on the character of the land chosen; he had spent more money clearing up walls, etc., than the land cost—$15 or more per acre. He thought a fair estimate of the annual cost of an orchard of one hundred acres would be about $15 an acre annually, but it would vary according to the land. He has an orchard of twenty-five acres which cost less, but it is easy soil. Light sandy soil is easy to work, but it is not the best; it gives the highest colored but not the longest keeping fruit. Strong loam with clay is the ideal soil for apples. An acre of good apple trees in fruiting is worth $2,000, and will pay good dividends. Land near a railroad, reached by a good road, might be cheap at $100 per acre, when land four or five miles away over a bad road might be dear at $5.

In answer to an inquiry about draining, the lecturer said that apple trees do not like to have their feet wet. Some land needs drainage and some does not; more needs it than we think.

Borers should be dug out two or three times a year—in September or October after they are hatched, and then again in May to get what escaped you. To prevent the borers from laying their eggs around the collar of the trees, place a mound of earth around them the last of April and do not take it away until the first of August.

Most apples are self-pollenizing and will fruit alone, but you will have better fruitage with more than one variety of apples in an orchard.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 31, 1900.

A meeting for Lecture and Discussion was holden today at eleven o'clock, Vice-President BENJAMIN P. WARE presiding.

The following lecture was delivered:

FUNGUS DISEASES COMMON TO CUCUMBERS, TOMATOES, AND LETTUCE UNDER GLASS.

By Professor GEORGE E. STONE, Amherst, Mass.

In considering this subject it should be stated that any single one of the three plants mentioned would furnish matter enough to occupy one's attention for more than an hour; indeed the consideration of either one of them would fill a large volume. We shall, however, briefly consider the fungus diseases common to these three crops, as well as touch upon some of the methods of cultivation. Diseases of plants have been known from the dawn of civilization. Rusts, smuts, mildews, and rots are old terms, which are mentioned in the most ancient writings. Before, however, we commence to consider the fungus diseases of these crops, let us fully understand what we mean by disease, and also some of the conditions which are favorable in the plant organization for the intrusion of fungi. We can define a disease as a failure or perversion of the normal physiological activities of the living organism. Diseases may arise from intrusion of parasites or they may be due to purely physiological disorders. In both instances conditions result which may be manifested in stunted growth, abnormally enlarged part, or disintegration of the tissues, which frequently result in the death of the organism. There is a disposition of plants as well as animals to disease, which may be an internal or inherited one, as we see in some variegated plants and in run-out stock, or an external or accidental disposition dependent upon environmental factors. It is also known that there are other conditions upon which disease depends; for example, a plant at the lower limit of vital activity is more susceptible, and also young tissues are more susceptible than old tissues to disease, as illus-

trated by "damping off" of young seedlings. Also, when a plant is in a state of inactivity it is more susceptible. The diseases which we are to consider at the present time are those to which greenhouse plants are subject, and which, to a certain extent, differ from those out of doors.

In growing greenhouse crops the gardener has the environments under his own control, and the more thoroughly he understands the proper conditions of the plants the less likely they are to be diseased. While the control of the plant's environment is desirable in many ways to the gardener, it also has its drawbacks, for if the gardener does not understand the plant's requirements diseases are sure quickly to show themselves much more disastrously than when out of doors, and left to nature's care. The principal factors which the gardener has to deal with are heat, light, moisture, and soil, including its chemical composition and physical properties, the latter being of as much importance as its chemical composition, inasmuch as the first requisite of normal plant development is proper environmental conditions.

We shall take up first the subject of cucumbers. These are extensively grown in our State and require a temperature from sixty-five to eighty-five degrees Fahrenheit. They are not especially sensitive to mechanical conditions of the soil, neither do they respond very quickly to fertilizer. A good soil for cucumbers is one made of decomposed sod and horse manure. This makes a light, friable soil. They require all the light possible under glass, especially between the months of November and March, a matter which is too little understood by those growing cucumbers. Some of the so-called diseases can be traced directly to the lack of light in the house. This is especially true where growers have resorted to the practice of using two layers of glass in their houses. The plants, under such conditions, cannot assimilate the carbon dioxide from the air properly, as the light is largely excluded by the two layers of glass and the usual two accompanying layers of dirt. As a result of this ignorant practice the loss in carbon assimilation and growth, according to my observation in certain cucumber houses in Massachusetts, is as high as seventy or eighty per cent. Under these conditions they behave like plants grown in the dark; that is to say, they are etiolated, their stems become weak and slender, they develop thin yellowish green leaves devoid of good

texture, and they are rendered more susceptible to disease. When raised under these conditions and exposed to the bright sun of spring they wilt badly and the foliage becomes quite useless to the plant, as a result of which the vines are poor, and owing to the lack of assimilation due to the paucity of green foliage the cucumbers grow stubby and bring a low price.

There are ten fungus diseases peculiar to the cucumber, which have received more or less attention. Some of these are of rare occurrence and only show themselves when something is radically wrong with the methods of cultivation of the crop. There are others, however, that are more or less universal and require consideration. Among these may be mentioned the damping fungus which attacks seedlings, the powdery mildew, stem rot, timber rot, anthracnose, and bacterial wilt. The last is peculiar to outdoor cucumbers in Massachusetts. It is caused by bacteria which plug up the vessels, thus interfering with the water supply. The disease, however, has received special attention by our government pathologists. The powdery mildew is more or less common and can be controlled by attention to moisture conditions and light. It is seldom found on vigorous plants of good texture, such as are grown under normal conditions. The damping fungus is troublesome to young cucumbers and can be prevented by sterilizing the soil in which the seeds are sown. Small quantities of soil can be easily steamed to a temperature of one hundred and eighty degrees F. or more, and if the plants are partially matured in steamed soil before transplanting little difficulty need be experienced with this fungus. This method is now used by some practical cucumber growers in Massachusetts. The anthracnose which attacks the leaves would seem to be caused by too great a difference between the day and night temperature. On this account it is far more common in the spring in greenhouses when the fires go out.

Besides these fungus diseases there are two or three troublesome pests which belong to the animal kingdom, known as aphis and thrip, which are injurious to the foliage, and nematodes, which give rise to galls on the roots. Aphis and thrip can be controlled by the use of tobacco in one form or another, while the only thing that will remove nematodes from a house is freezing, desiccation, or sterilization of the soil. In order to freeze

the soil it would probably, in most instances, have to be removed from the house, but the desiccation can be most easily and cheaply done during the summer months when the house is very likely to remain unused. To accomplish this the house should be closed up tightly and the soil should be forked over a few times and allowed to dry out as completely as possible. The temperature on hot days will under these conditions go as high as one hundred and forty or one hundred and fifty degrees F. in the house. Sterilizing the soil is more troublesome than the desiccation method, but when done properly is superior to either of the preceding methods. This is accomplished by passing steam through two-inch tile buried in the soil at from eight to twelve inches deep and about twelve inches apart. A large high-pressure boiler will heat a considerable quantity of soil to one hundred and eighty degrees F. in a short time.

Tomatoes require similar temperature and moisture conditions to those of the cucumber. They respond, however, more readily to fertilizers and, like the cucumbers, they should be pruned to get the best results. There are some twelve fungus diseases recorded for tomatoes, but the fruit rot and mildew are the most troublesome diseases in greenhouses. These can be controlled by spraying. They also, like the cucumbers, are subject to nematodes and the same method of treatment applies to both.

The lettuce is the most difficult of the three plants enumerated to grow under glass, and no finer examples of skill in lettuce growing can be seen anywhere in the world than in the neighborhood of Boston. The coast soil, in the first place, is especially adapted to lettuce growing, whereas that in the interior of Massachusetts is not so well adapted, on account of containing a larger per cent of fine sand, silt, and clay and a less amount of coarse material.

There is no plant which we have to deal with that is more susceptible than lettuce to changes in the physical properties of the soil. On this account the cultivation of the so-called head lettuce is confined almost entirely to the Atlantic coast soils where the percentage of coarse constituents is much higher than in the inland soils. In the West the headless varieties of lettuce are grown almost entirely Young lettuce plants (prickers) are more susceptible to soil conditions than those half matured, and when

prickers are placed in a soil where the fine constituents far exceed the coarse material their development is arrested, a feature which is brought about by abnormal root respiration. A typical heading lettuce soil should possess a water-retaining capacity equal to about thirty-five or forty-five per cent, while a soil possessing a water-retaining capacity of seventy per cent is not adapted to lettuce.

There are several fungus diseases listed for the lettuce. Among the more important ones are the mildew, top burn, the drop, and the rhizoctonia. At the Hatch Experiment Station, Amherst, especial attention has been paid to the diseases of lettuce, and, as in most instances where the pathological conditions of a plant has been given thorough attention, and where we have generally supposed there is a certain abnormal condition brought about by a single disease, we have found a number of distinct ones which frequently require distinct methods of treatment. The most troublesome disease, however, is what is known as the drop. This is caused by a fungus (*Sclerotinia Libertiana*, Fckl.) which propagates by a mycelium that ramifies through the soil, and also by small hard black masses known as sclerotia which develop from the mycelium. This disease frequently causes great losses in our State. Some houses almost entirely succumb to it, whereas many other growers have from twenty-five to fifty per cent of diseased plants in their houses. It has been found that the best method of treating this disease, and we may add the only one, is by the use of heat or sterilization of the soil. The sterilizing method has already been tried in various forms by many of our largest and most proficient growers. Numerous experiments with gas and chemicals have shown but the slightest efficiency in controlling this. Partial sterilization methods are being tried to control this disease, one of which consists in covering the soil with a layer of about one inch of sterilized soil. This succeeds in greatly reducing the loss. Two inches of sterilized soil is far superior to one, but the steaming of the whole mass of soil is much cheaper in the end. The growth of plants in such soil is greatly accelerated by the effect of the heat on the humus compounds. When this disease, moreover, is once eradicated, care being taken to prevent the inoculation from refuse heaps, there appears to be no reason why it cannot be kept out of

the house indefinitely. The same method of treatment would appear to apply to some of the other fungus diseases, such as the rhizoctonia, which appears to propagate by a mycelium.

A disease known as the top burn, which is characterized by the tops of the young leaves blackening, is well known to lettuce growers. This is caused by no organism, although bacteria sometimes occur in connection with the blackened tissues as secondary intrusions. The disease is the result of functional disorders due to the peculiarities of the greenhouse environment. If a sharp knife is plunged into the soil and passed around close to the plant so as to cut off the ends of the roots, we can produce the characteristic symptoms of top burn. This simple experiment shows us that top burn is connected incidentally, at least, with root absorption, but there are other factors which bear upon the disease. It is most commonly brought about in the following manner: If the night and day temperatures are run high during a period of cloudy weather and this is followed by bright sunshine top burn is quite sure to follow. The reason of this is that high temperature accompanied with cloudy weather causes active growth which produces tissue of an extremely delicate character. When exposed to intense sunlight and rapid transpiration, the edges of the young leaves wilt, collapse, and turn black. The remedy for this disorder consists, therefore, in paying strict attention to the night and day temperatures, especially during successive days of cloudy weather. The control of this latter disorder is indeed a good test of one's proficiency in growing lettuce.

This lecture was illustrated by diagrams and photographs showing the characteristic diseases of Cucumbers, Lettuce, and Tomatoes.

Discussion.

Varnum Frost asked whether the age of cucumber seed contributes towards the crop. Farmers want it from three to ten years old.

Professor Stone said that the subject had never been investigated. The best crop he had ever grown was from seed one year old. In a good house cucumber seed will germinate in five or six days, and the plants will bear fruit six weeks or two months later. The amount of light will have a good deal to do with it.

Thomas Harrison asked whether it is necessary to keep insects in a cucumber house to fertilize the plants. Professor Stone said it is not necessary with some varieties, but it is quite important to have them with the varieties we grow. One would be likely to have a small crop without them.

In answer to a question of Varnum Frost as to how long cucumbers could be grown in the same soil, Professor Stone said he thought forever, if it is renovated with manure.

Professor Stone added that cultivators do not realize that ninety-five per cent of the food of plants comes from the air. Starch is formed by the action of light on the green chlorophyll cells of the leaf. If an opaque object, such as a piece of cork, is placed upon both sides of a leaf and held securely the starch already formed there disappears and no new starch is formed. The same thing takes place when light is obscured in a house; even the shadows cast by the cumbersome framework decrease starch formation. Cucumber leaves arrange themselves as far as possible so that none shall be debarred from the light.

He recommended a single layer of good glass in building a house in preference to double glass. In all probability the large house is cheaper in proportion than a small house.

Some diseases are the result of irrational treatment. Others occur to apparently healthy plants and are caused by genuine parasites which will show themselves if the germs are present. Anthracnose usually comes in spring when the fires are discontinued.

About forty kinds of bacterial blight are known. That of cucumbers is seen out doors but not in the house. It gains entrance to the vessels of the plant and the plant wilts because the vessels are clogged up.

Mildew is a white fungous growth occurring on the surface of the leaves, and the best way to prevent it is to cultivate the plants so that they shall be strong and healthy, as they are then less likely to be attacked.

Another wilt disease of the cucumber is caused by insufficient light, which develops weak plants. The growth of potato stems in the cellar is a familiar illustration of this. Cucumbers when subject to these conditions and exposed to bright sunshine wilt down, but revive when night comes and the next day wilt again.

Professor Stone mentioned three insect pests; the first, the aphis, can be controlled by tobacco. The thrip is very small but very destructive; it can be controlled by the use of nicotine extract or fir-tree oil. The nicotine should be mixed with water and allowed to drip on hot iron. One or two treatments have cleared houses of this pest. Nematodes or eel worms produce galls on roots; they are allied to earth worms but more nearly to the worms found in paste or vinegar. They injure cucumbers, violets, and many florists' plants, but can be destroyed by sterilizing the soil. This, however, will not kill all bacteria. An effectual method of ridding the soil of nematodes is to close the house in July and August, when the heat of the sun will raise the temperature to a hundred and forty or fifty degrees Fahrenheit. The soil should be dug over two or three times so as to expose all parts to the heat. There is no danger of contamination if refuse vegetable matter is not brought into the house again. A house which he sterilized has not been troubled for three years.

Tomatoes thrive under similar conditions to those adapted for cucumbers. They respond very quickly to fertilizers; in this respect they are unlike cucumbers, but they will thrive with less light. They are injured by black rot, caused by a fungus of which there is very likely more than one species. Nematodes also trouble tomatoes.

Varnum Frost thought that the black rot in tomatoes is caused by lack of moisture. Some varieties are free from it, but all Livingston's varieties are subject to it.

The lecturer said that black rot in tomatoes may be cured by the Bordeaux mixture — four pounds of sulphate of copper and four pounds of lime to from twenty-five to fifty gallons of water. By irrational treatment we may get a large number of abnormal diseases in plants. Excess of moisture causes rupture of the tissues of the leaves (œdema); this is a purely physiological effect which never occurs outdoors; it is due to trying to force plants too rapidly.

The lecturer spoke of the remarkable skill of the lettuce growers about Boston; they have learned the most intricate secrets of the business. No plant is so sensitive to soil conditions as lettuce; it is more important than plant food. He had made mechanical analyses of soils and found that that at Arlington will

roll off the hand; it is the best soil in the United States for lettuce. In the west they have to grow other kinds than head lettuce because the soil is not suited to that. Lettuce responds quickly to fertilizers; it must also have a good deal of organic matter in the soil, and it requires a great amount of light.

Fungus diseases have been especially studied. Amateurs get the whole category of diseases. There is no need to worry about downy mildew; there is no need to have it if the plants are properly treated. It appears to be destroyed by summer heat. There are spores which can no doubt stand it, such as the winter spores, but these are not produced in our house.

Top burn is a physiological disease brought about by inattention to the relationship existing between temperature and light conditions; as a result tender tissues are produced. The tender tissues do not get sufficient water from the soil, to meet excessive evaporation and consequently wilt.

In rhizoctonia the fungus eats the blade of the lower leaves and leaves the petiole and midrib. The drop is the name of one of the most disastrous diseases that lettuce growers have to contend with; in one night the whole plant will go down flat. Some growers at Arlington lost whole houses last year. Many methods have been tried, but it can be controlled by one method and only one — by heating the soil. One inch of soil sterilized by heating helps very much, but it must be repeated after each crop. If pipes are put in so as to heat the soil to one hundred and eighty degrees it drives out this disease once for all. Messrs. Hittinger's method is to turn on water from the hot-water pipes, which heats the soil up to about two hundred degrees F. This gives good results. Lettuce is rarely troubled with nematode worms.

The Chairman thought that farmers are not generally aware that so large a portion of the food of plants is drawn from the air.

The lecturer said that in a stick of wood only two per cent is ashes; all the rest is drawn from the air.

Mr. Harrison said that this being the last in the course of lectures for the season he felt it a duty to say that he had received a great deal of pleasure and information at these meetings and it appeared to him from the more than usual number of persons present that there has been great interest in these gatherings.

The topics have been useful and varied, relating to horticulture and other kindred subjects both indoors and out; they have carried us through the fields and forests; along the highways and byways; among the cultivated and wild flowers, and a great variety of trees and shrubs, natives of a great range and variety of climate; they have included many of our useful fruits and vegetables; their illustrations have carried us through all the seasons of the year — spring, summer, autumn, and winter. We must not forget those who have spent so much time and labor in bringing together such an array of talent for our use and instruction, and for benefits received we cannot do less towards our Committee on Lectures and Publication than return to them a most hearty and sincere vote of thanks.

Mr. Harrison's motion was unanimously carried.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1900.

PART II.

BOSTON:
PRINTED FOR THE SOCIETY.
1901.

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TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, April 7, 1900.

A duly notified stated meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

Ex-President William C. Strong, Chairman of the Committee appointed at the last meeting to confer with the Boston Co-operative Flower Growers' Association in regard to holding their exhibition of carnations in Horticultural Hall, reported that the Committee were very cordially received by the Association, and that the latter were very desirous to act in concert with the Horticultural Society, but that no arrangement could be made at present, as the exhibition does not occur again until February next, and the present officers were elected only for the present year.

The report was accepted and it was voted that the Committee be continued and that they endeavor to make the desired arrangements for the next year.

The President, as Chairman of the Executive Committee, made the following report for that Committee:

At the regular meeting of the Executive Committee, on the 31st of March, a letter was received from the Chairman of the Committee on Plants stating that his Committee had made awards the past year to an amount exceeding the appropriation by $75. He gave as an explanation of this, that he assumed office after the beginning of the year, upon the death of his predecessor, and the duties of the office were new to him. Considering the circumstances the Executive Committee recommends to the Society an additional appropriation of $75 to cover the awards of the Committee on Plants for the year 1899. In making this exception

to our rules the Executive Committee wishes to emphasize the imperative necessity that the various Committees of the Society should keep within the limits of their appropriations. These are on a liberal scale, and considering the present condition of our finances it is important that there be no deviation from the rule.

The report was accepted and the appropriation was voted.

A question in regard to the property of the Society in the lectures delivered before it was referred to the Committee on Lectures and Publication with full power.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

SAMUEL H. COLTON, of Worcester.
PETER MURRAY, of Fairhaven.
MRS. HENRIETTA PAGE, of Boston.
BAYARD THAYER, of Boston and Lancaster.
MRS. BAYARD THAYER, of Boston and Lancaster.

On recommendation of the Executive Committee

CLARENCE H. CLARK, Ex-President of the Pennsylvania Horticultural Society, Philadelphia, and
ALBERT VIGER, President of the National Society of Horticulture of France, Paris,

were elected Honorary Members of the Society, and

COL. GUSTAVUS B. BRACKETT, Pomologist to the United States Department of Agriculture, Washington, D. C., and
PROFESSOR CARL HANSEN, of the Royal College of Agriculture, Copenhagen, Denmark,

were elected Corresponding Members.

Adjourned to Saturday, May 5.

BUSINESS MEETING.

SATURDAY, May 5, 1900.

An adjourned meeting of the Society was holden today at eleven o'clock, the President in the chair.

The President announced the decease, on the second instant, of John Davis Williams French. The President, with Charles W.

Jenks and Benjamin M. Watson, were appointed a Committee to prepare a memorial of Mr. French.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

IRVING B. FROST, of Belmont.
ELISHA N. PIERCE, of Waltham.

Adjourned to Saturday, June 2.

BUSINESS MEETING.

SATURDAY, May 26, 1900.

A special meeting of the Massachusetts Horticultural Society was holden today at ten o'clock, in accordance with a request from twelve members.

In compliance with this request, agreeably to Sections VIII and XII of the Constitution and By-Laws, the following notice was sent to every member of the Society:

MASSACHUSETTS HORTICULTURAL SOCIETY.

BOSTON, May 19, 1900.

Pursuant to the Provisions of the Constitution and By-Laws of this Society, at the request of twelve members, I hereby call a special meeting of the Society, to be held at Horticultural Hall, 101 Tremont Street, Boston, on Saturday, the twenty-sixth day of May, 1900, at ten o'clock in the morning, to listen to a report of the Building Committee appointed under a vote of the Society, passed at its meeting on April 22d, 1899; and to see whether the Society will approve and adopt the plans presented by the said Building Committee, and will appropriate the sum of $60,000, in addition to the sum heretofore appropriated, for the erection of a building by said Building Committee in accordance with said plans.

FRANCIS H. APPLETON, *President.*

ROBERT MANNING, *Secretary.*

At this meeting the President was in the chair. The call for the meeting was read by the Secretary.

Augustus P. Loring moved the following votes:

Voted: To approve and adopt the plans for a new building presented by the Building Committee at this meeting.

Voted: To appropriate the sum of Sixty Thousand Dollars in addition to the sum heretofore appropriated for the erection of a building by the said Building Committee, in accordance with said plans.

Benjamin C. Clark spoke in favor of the motion and William C. Strong urged caution in taking so important a step.

There appearing to be a misunderstanding in regard to the time for which the meeting was called, an unofficial circular having stated it as eleven o'clock, it was voted, 25 to 6, to adjourn until eleven o'clock.

On reassembling the President stated that since the adjournment the Executive Committee had held a meeting, and that they had approved the additional appropriation of $60,000 asked for by the Building Committee, one member not voting.

The President again read the votes offered by Mr. Loring.

Joseph H. Woodford moved that the matter be divided and the two votes taken up separately. This motion was negatived.

Benjamin P. Ware spoke against the votes.

Mr. Loring moved that after the polls are opened they be closed at two o'clock. This motion was carried.

Henry L. Clapp asked what provision had been made for a Herbarium, and a motion was carried that the Building Committee be requested to consider this subject and provide a place for a Herbarium if possible.

George B. Dorr moved that a ballot now be taken on the votes moved by Mr. Loring and this vote was carried.

It was voted that the Chair appoint a Committee of five to receive, assort, and count the ballots given and report the number. The Chair appointed as this Committee Henry S. Adams, Patrick Norton, Edwin A. Hall, Miss C. M. Endicott, and Miss Mary C. Hewett.

The polls were closed at two o'clock, and the Committee made the following report:

The Committee appointed to receive, sort and count the ballots

cast at the special meeting on the 26th of May, 1900, upon the following votes :—

Voted, To approve and adopt the plans for a new building presented by the Building Committee at this meeting,—

Voted, To appropriate the sum of Sixty Thousand Dollars in addition to the sum heretofore appropriated for the erection of a building by the said Building Committee in accordance with said plans, report the total number of votes cast to be 196, of which 182 were yes and 14 no.

HENRY S. ADAMS, *Chairman*,
MARY C. HEWETT,
EDWIN A. HALL,
CHARLOTTE M. ENDICOTT.

COMMONWEALTH OF MASSACHUSETTS.

SUFFOLK, ss. BOSTON, May 26, 1900.

Then personally appeared the above named Henry S. Adams, Mary C. Hewett, Charlotte M. Endicott, and Edwin A. Hall, and made oath that the above return is correct.

(signed) CHARLES E. RICHARDSON, *Notary Public*.

The report was accepted and the meeting was then dissolved.

BUSINESS MEETING.

SATURDAY, June 2, 1900.

An adjourned meeting of the Society was holden at eleven o'clock today, the President, FRANCIS H. APPLETON, in the chair.

The President, as Chairman of the Committee to prepare a memorial of the late John Davis Williams French, presented the following, which was accepted and referred to the Committee on Publication :

John Davis Williams French, the son of Jonathan French, who is our oldest member, died at Atlantic City, N. J., May 2, 1900, and we mourn his loss.

His early home was in Roxbury, where, amid the productive and beautiful horticultural surroundings of those days he acquired his fondness for all out-of-door occupations.

Mr. French obtained his early training at the schools of Roxbury or Boston, and graduated at Harvard College in the Class of 1863.

After graduating he served as a valued member of the Christian Commission, with our army at the front.

In his agricultural work, results upon his lands at North Andover, Essex County, have proved him to have been a skillful farmer, horticulturist, and forester. He knew the value in agriculture of the wise application of intelligence thereto, and it was his earnest endeavor to impart and have imparted, such ideas to all those who could or would be benefited by such application and knowledge.

He has been an exhibitor and officer in this Society. On our Library Committee, and on our Committee on Lectures and Publication, it was his aim always to advance the quality and value of our Library and Lectures, in proportion as our funds would allow, and to bring our volumes before our members and students in horticulture as prominently as possible.

He was a strong advocate of better accommodations for our valuable library, both in shelf room, and in the conveniences for examining our books, but equally eager was he that the Hall accommodations should be improved so that the greatest possible number of our citizens should enjoy and profit by the beauty of such exhibitions as we were able to present.

This Society has been distinctly honored and benefited by a bequest of five thousand dollars for the increase of the Library, and of such books from his library as the Society shall select. Such an act shows a spirit of interest in the work assigned to this Society that is to be commended and encouraged.

His interest in all branches of Forestry and his activity in "Village Improvements" have made him useful and influential in National, as well as local, forestry matters.

His last effort in the cause of tree-culture was shown in his earnestness to complete the organization of the new Boston Common Society, with the object of aiding in the maintenance of our ancient Common in the best possible condition.

He was fond of high-class live-stock of all kinds, although his attention has been chiefly directed to Ayrshires, and in lesser degree to Guernsey breeds of cattle.

He was an earnest and active worker with mind, body, and

purse in the cause of Christianity within the Episcopal Church and outside of it, and in many places will he be greatly missed, and his place will be hard to fill.

Mr. French was at one time a member of the Boston Common Council from Ward 11, and at the time of his death was a Trustee of the State Agricultural College, President of the Bay State Agricultural Society, Vice-President of the American Forestry Association, and Vice-President of the Essex Agricultural Society.

We extend to his aged father, and other members of the family, our sincere sympathy.

FRANCIS H. APPLETON,
CHARLES W. JENKS, } *Committee.*
BENJAMIN M. WATSON,

A deed conveying to Charles E. Cotting, *et al.*, trustees, the old "Horticultural Hall Estate," so-called, on Tremont, Bosworth, and Bromfield Streets, Boston, was then read and considered, and upon motion it was

Voted, That the President, Francis H. Appleton, be, and he hereby is, authorized and instructed to execute, acknowledge and deliver in the name and behalf of the Corporation the deed which has just been read; also to execute and accept a lease of the conveyed premises on such terms as he may consider proper.

The Secretary announced the receipt of letters from Clarence H. Clark, Ex-President of the Pennsylvania Horticultural Society, and Albert Viger, President of the National Horticultural Society of France, acknowledging with thanks, the Honorary Memberships to which they had been elected.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

MRS. GEORGE FRANCIS ARNOLD, of Brookline.
ABRAHAM B. COFFIN, of Winchester.
THEODORE DWIGHT, of Weston.
MISS MARY COFFIN JACOBS, of Dorchester.
JAMES S. RUSSELL, of Milton.

The meeting was then dissolved.

BUSINESS MEETING.

SATURDAY, July 7, 1900.

A duly notified stated meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

In the absence of the Secretary, by reason of illness, the President appointed Miss Mary C. Hewett Secretary *pro tem.*

The President, as Chairman of the Executive Committee, presented a report from that Committee, recommending an additional appropriation of $3 for the Committee on School Gardens and Children's Herbariums, for prizes awarded in 1899, agreeably to the request of that Committee. The appropriation was unanimously voted.

The President also presented a report from the Executive Committee, recommending an additional appropriation of $60,000 asked for by the Building Committee, which was voted at a special meeting of the Society on the 26th of May, and now came up for final action. It was unanimously voted.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

FREDERICK C. MOSELEY, of Dorchester.
GEORGE J. PUTNAM, of Brookline.
DR. WILLIAM L. RICHARDSON, of Boston.

Adjourned to Saturday, August 4.

BUSINESS MEETING.

SATURDAY, August 4, 1900.

An adjourned meeting of the Society was holden at eleven o'clock today. In the absence of the President and Vice-Presidents, Ex-President William H. Spooner was called to the chair.

The Chair announced the following Committees appointed by the President:

On the Revision of the Constitution and By-Laws, provided for at the January meeting,

PRESIDENT FRANCIS H. APPLETON, *Chairman.*

WILLIAM J. STEWART, AUGUSTUS P. LORING,
CHARLES S. SARGENT, DR. HENRY P. WALCOTT.

On School Gardens, School Herbariums, and Children's Herbariums,

HENRY L. CLAPP, *Chairman*,

MISS KATHARINE W. HUSTON, MRS. H. L. T. WOLCOTT,
CHARLES W. JENKS, HENRY S. ADAMS,
WILLIAM P. RICH, WILLIAM E. C. RICH, *Secretary.*

On the Nomination of Officers and Standing Committees for the year 1901,

C. MINOT WELD, *Chairman*,

FRANCIS BLAKE, CHARLES W. JENKS,
WARREN H. HEUSTIS, CHARLES W. PARKER,
WALTER C. BAYLIES, ARTHUR HUNNEWELL.

Ex-President William C. Strong announced the decease of Charles H. B. Breck, for many years a Vice-President of the Society, and Chairman of the Committee of Arrangements, and moved the appointment of a Committee of three to prepare a memorial, and Mr. Strong, Charles B. Travis, and Joseph H. Woodford were accordingly appointed. Mr. Strong stated that it would be agreeable to Mr. Breck's family to have a representative of the Society among the pall-bearers, and Mr. Travis was requested to perform that duty.

Adjourned to Saturday, September 1.

BUSINESS MEETING.

SATURDAY, September 1, 1900.

An adjourned meeting of the Society was holden at eleven o'clock today, the President, FRANCIS H. APPLETON, in the chair.

Ex-President William C. Strong, Chairman of the Committee appointed at the last meeting to prepare a memorial of the late Charles H. B. Breck, presented the following report, which was accepted and ordered to be entered on the records of the Society.

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CHARLES W. JENKS, HENRY S. ADAMS,
WILLIAM P. RICH, WILLIAM E. C. RICH, *Secretary.*

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Adjourned to Saturday, September 1.

BUSINESS MEETING.

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An adjourned meeting of the Society was holden at eleven o'clock today, the President, FRANCIS H. APPLETON, in the chair.

Ex-President William C. Strong, Chairman of the Committee appointed at the last meeting to prepare a memorial of the late Charles H. B. Breck, presented the following report, which was accepted and ordered to be entered on the records of the Society.

IN MEMORY OF CHARLES HENRY B. BRECK.

Again we are called to mourn the loss of one of our oldest, most active, and most esteemed members. Charles Henry B. Breck entered the immortal life August 1, 1900, after an earthly life lacking but a single month of fourscore years. He was the only son of Hon. Joseph Breck, who was one of the original members of this Society, and a former President. The son inherited the tastes and love of flowers of his father, and very naturally entered with him into the business of seeds and agricultural wares. The long-established reputation of this house has been sustained from father to son, until it has become favorably known throughout the world.

Mr. C. H. B. Breck became a member of this Society in 1857, and continued his active connection from that date until the last year of his life, thus being exceeded in long continued service by but very few other members. In 1871 he was elected Chairman of the Committee of Arrangements, continuing to be elected to this office until 1883. In 1876 he was elected one of the Vice-Presidents, which office he held to the day of his death. He was also for several years a member of the Executive Committee and of other committees, and during this long service, and by his wide acquaintance and friendly intercourse with our members, he contributed largely to promote the interests of the Society. It is not for us to speak of his honorable and successful business career, his untarnished record as alderman of the City of Boston, and other offices which he held with honor. In our memory he will dwell as a genial companion, with whom we have had long and goodly fellowship and whose loss we sincerely mourn.

To the members of his family, who have had a lifelong experience of his strong attachments and his kindly interest in their welfare, which knew no limit, we extend our heartfelt sympathy in their loss.

We recommend that a copy of this expression be sent to the family of the deceased.

WILLIAM C. STRONG,
CHARLES B. TRAVIS,
J. H. WOODFORD. } *Committee.*

BOSTON, September 1, 1900.

The President announced that Benjamin H. Pierce, of Watertown, had made a bequest of one thousand dollars to the Society, the principal to be kept intact, and the income to be applied to the introducing of new fruits.

Warren Howard Heustis, from the Committee to nominate candidates for Officers and Standing Committees for the year 1901, presented a report, which was accepted. It was voted that the Committee be continued and requested to nominate candidates for any vacancies which may occur on the ticket.

The meeting was then dissolved.

BUSINESS MEETING.

SATURDAY, October 6, 1900.

A stated meeting of the Massachusetts Horticultural Society, being the Annual Meeting for the choice of Officers and Standing Committees, was holden at eleven o'clock today, the President, FRANCIS H. APPLETON, in the chair.

The Secretary stated that the meeting had been duly notified to the members of the Society, agreeably to the Constitution and By-Laws.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

GEORGE MACKIE, M. D., of Attleboro.
GUSTAVUS C. HOLT, of Belmont.
EDWARD E. COLE, of Boston.
JULIUS HEURLIN, of South Braintree.

On recommendation of the Executive Committee,

SIR TREVOR LAWRENCE, President of the Royal Horticultural Society, London, and

DR. HENRY S. PRITCHETT, President of the Massachusetts Institute of Technology, Boston,

were elected Honorary Members of the Society, and

HENRY H. GOODELL, President of the Massachusetts Agricultural College, Amherst, and

B. T. Galloway, Horticulturist and Superintendent of Gardens and Grounds of the United States Department of Agriculture, Washington, D. C.,

were elected Corresponding Members of the Society.

Agreeably to the Constitution and By-Laws the President appointed William C. Strong, Hon. Aaron Low, and Charles W. Jenks, a Committee to receive, assort, and count the votes given and report the number. The polls were opened at ten minutes past eleven o'clock, and closed at ten minutes past one o'clock, and the Committee reported that the persons named on the ticket presented by the Nominating Committee had a plurality of votes and were elected, except that O. B. Hadwen was elected President and member of the Finance Committee in place of Francis H. Appleton.

The report was accepted, and the persons reported by the Committee as elected were, agreeably to the Constitution and By-Laws declared by the President to have a plurality of votes, and to be elected Officers and Standing Committees of the Society for the year of 1901.

Adjourned to Saturday, November 3.

BUSINESS MEETING.

Saturday, November 3, 1900.

An adjourned meeting of the Society was holden today at eleven o'clock, the President, Francis H. Appleton, in the chair.

The President, as Chairman of the Executive Committee, reported a recommendation that the Society appropriate the following sums for Prizes and Gratuities for the year 1901:

For Prizes and Gratuities for Plants . . .	$2,000
" " " " " Flowers . . .	2,500
" " " " " Fruits . . .	1,700
" " " " " Vegetables . .	1,200
" " " " " Gardens . . .	500
" " " " " Native Plants . .	175
Total	$8,075

For School Gardens and Children's Herbariums .	$125
" Incidental Expenses of the last named Committee	75

The report was accepted, and, agreeably to the Constitution and By-Laws, laid over for final action on the first Saturday in January.

The Executive Committee also recommended that President elect O. B. Hadwen be added to the Building Committee, which was accordingly done.

A recommendation from the Executive Committee, that the Society take into favorable consideration the offer of Mr. Charles S. Sargent to arrange an exhibition at the opening of the Society's New Hall, was referred to the Committee of Arrangements.

On recommendation of the Finance Committee it was

Voted, That the bequest of John S. Farlow of $2,500 be used as a fund, and that the interest, at the rate of four per cent per annum, be used only for the purchase of books for the Library.

The Secretary read the following letter from H. H. Hunnewell:

WELLESLEY, 27 October, 1900.

Mr. R. Manning, *Secretary*,

Dear Sir: — I have to acknowledge the receipt of your letter informing me of my election as Chairman of the Finance Committee and a member of the Executive Committee of the Massachusetts Horticultural Society.

In expressing my thanks for the compliment, I feel obliged to add that having arrived at an age when one realizes the necessity of some relief from his cares and responsibilities, I am compelled to tender my resignation as a member of these two Committees and to beg to be excused from further service.

Truly yours,

H. H. HUNNEWELL.

On motion, Ex-Presidents William C. Strong, William H. Spooner, and Nathaniel T. Kidder were appointed a Committee to take into consideration the long continued and eminent services of Mr. Hunnewell to the Society and to prepare an expression of the feelings of the Society on his retirement, and also to nominate a candidate to fill the vacancies caused by his resignation.

William C. Strong moved as the sense of the Society that President Appleton be requested to retain the position of Chairman of the Building Committee until the New Hall shall be completed. The motion was unanimously carried.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

SAMUEL H. COLTON, of Worcester.
JOSEPH FRANCIS BRECK, of Allston.
ARCHIBALD SMITH, of West Somerville.

Adjourned to Saturday, December 1.

BUSINESS MEETING.

SATURDAY, December 1, 1900.

An adjourned meeting of the Society was holden at eleven o'clock today, the President, FRANCIS H. APPLETON, in the chair.

Ex-President William C. Strong, Chairman of the Committee appointed at the last meeting, on the occasion of the resignation by H. H. Hunnewell of the Chairmanship of the Finance Committee, to take into consideration his long continued and eminent services to the Society, and to prepare an expression of the feelings of the Society on his retirement, presented the following report:

The Committee to whom was referred the resignation of Mr. H. H. Hunnewell from the offices of Finance and Executive Committees have to report as follows:

For nearly fifty years it has been the good fortune of this Society to have had the active and liberal support of one of the foremost cultivators and patrons of landscape art in the country. Mr. Hunnewell's estate at Wellesley has for a long time been the Mecca for lovers of sylvan and floral beauty, where they were sure to find the rarest and most perfect specimens of every desirable tree or plant which money and skill could procure. In extent, variety, and perfection of culture it is believed that this place is unsurpassed, in this or in any other country. The exhibitions of

this Society have been regularly and largely supported by generous contributions from these collections. In addition to this support, Mr. Hunnewell has given his services on the Finance Committee for the past thirty-four years, and for the past nineteen years he has been its Chairman, at a time when many changes, investments, and transfers have taken place, thus making his clear judgment, large experience, and superior facilities, of great advantage to the Society.

It is therefore with much regret that we receive his request that he be released from further service on the Finance and Executive Committees. But we recognize his right to a well-earned release from this responsibility, and while we must accede to his request and accept his resignation, we can assure him that his past services are highly appreciated, and will ever be held in grateful remembrance by the Society. And it is our earnest hope that he may yet continue to witness and enjoy the enlarged influence of the Society, so successfully promoted by his skill and labors.

In further recognition of our indebtedness, and the appropriateness and felicity of continuing this service in the same line, your Committee would nominate Mr. Walter Hunnewell to the Chairmanship of the Finance Committee to fill the vacancy caused by the resignation of his honored father.

All of which is respectfully submitted by

WILLIAM C. STRONG,
WILLIAM H. SPOONER, } *Committee.*
NATHANIEL T. KIDDER,

BOSTON, December 1, 1900.

The report was unanimously accepted, and Walter Hunnewell was unanimously chosen to the Chairmanship of the Finance Committee.

Francis H. Appleton was unanimously chosen to fill the vacancy on the Executive Committee caused by the election of Walter Hunnewell to the Chairmanship of the Finance Committee.

William J. Stewart, Chairman of the Committee on Establishing Prizes, presented the Schedule of Prizes for 1901, which was accepted and referred to the Committee on Publication. A printed statement of the changes made from the Schedule of 1900 was also presented.

The Annual Report of the Committee on Plants was presented by William Wallace Lunt, Chairman.

The Annual Report of the Committee on Flowers was presented by J. Woodward Manning, Chairman.

The Annual Report of the Committee on Fruits was presented by E. W. Wood, Chairman.

The Annual Report of the Committee on Vegetables was presented by Warren Howard Heustis, Chairman.

The Annual Report of the Committee on Gardens was presented by Patrick Norton, Chairman.

The Annual Report of the Committee of Arrangements was presented by Joseph H. Woodford, Chairman.

The Annual Report of the Committee on the Library was presented by William E. Endicott, Chairman.

William H. Spooner presented his Annual Report as Delegate to the State Board of Agriculture.

These eight reports were severally accepted and referred to the Committee on Publication.

The President, as Chairman of the Executive Committee, reported a recommendation that the Society appropriate the same sum as the present year, $250, for the use of the Committee on Lectures and Publication for the year 1901. The report was accepted, and, agreeably to the Constitution and By-Laws, was laid over until the first Saturday in January for final action.

After some discussion of a proposition to celebrate the opening of the New Hall by an exhibition of plants, etc., the following vote was passed:

That the Building Committee be authorized to hold a Special Exhibition to open the New Hall of the Society at such time as shall be possible, provided the Society is involved in no financial expense thereby.

The President read the following letter from Sir Trevor Lawrence, President of the Royal Horticultural Society, London:

BURFORD, DORKING, Nov. 3, 1900.

Dear Sir:—I have delayed acknowledging your esteemed letter of the 6th ult. in the hope that I might have the photograph you so kindly asked for to send with my response. I fear, however, that it must follow later.

Will you, therefore, be so kind now as to accept for yourself and to convey to the Massachusetts Horticultural Society, my grateful thanks for the honor the Society has conferred upon me. I accept it in the spirit of kindly good fellowship ever prevalent among gardeners, and as a token that in the States a cordial good feeling to the mother country prevails among her children, as does an affection for our kith and kin across the Atlantic here.

I am yours truly and faithfully,

TREVOR LAWRENCE,

President Royal Horticultural Society.

P. S. I rejoice to say that several young men educated in my garden have found happy and prosperous homes with you.

Acceptances and thanks were also received from Dr. Henry S. Pritchett, President of the Massachustts Institute of Technology, Honorary Member, and Henry H. Goodell, President of the Massachusetts Agricultural College, Amherst, and B. T. Galloway, Chief of the Horticultural Division of the United States Department of Agriculture, Washington, D.C., Corresponding Members.

The decease of William Saunders, late Horticulturist and Superintendent of Gardens and Grounds of the United States Department of Agriculture, Washington, D. C., was announced, and Benjamin P. Ware, Hon. Aaron Low, and J. Woodward Manning were appointed a Committee to prepare a memorial.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

GEORGE C. WALTHAM, of Dorchester.
ANDREW ROBESON SARGENT, of Brookline.
NATHAN MATTHEWS, JR., of Boston.

The meeting was then dissolved.

REPORT

OF THE

COMMITTEE ON PLANTS.

FOR THE YEAR 1900.

By WILLIAM WALLACE LUNT, CHAIRMAN.

The Committee on Plants herewith present to the Society their report for the year 1900.

At the beginning of the year your Committee received from President Appleton a communication suggesting that strict ecomomy be kept to the fore in awarding prizes and that certain rules be more closely followed regarding the same. It has therefore been something of an experimental year, and while a higher standard has been established we regret that frankness compels us to state that it has not been as successful as we could wish.

The well nigh universal custom of awarding a Silver Medal to the *first* exhibitor of any *new* or *rare* plant, has been departed from in some cases, it being thought that where such plants were acquired by purchase it was an injustice to the party who originated it to award such high honor to one whose skill had not entered into its creation, and it has been deemed advisable in such cases to award a First Class Certificate of Merit.

Another problem which your Committee have endeavored to solve, is that of awarding prizes for *Superior Cultivation*, the question being, as to who is responsible for such cultivation, the owner of the plant, who has nothing whatever to do with its culture, or the gardener who cares for it daily and to whose skill and watchfulness is due its superior condition.

As the watchword has been *economy* for the past year, can we honestly state it has been a success? Have our exhibitions been

as large and of such excellence as of former years? To the first question we may reply yes and no. We certainly have had the exhibits presented in better condition, only two having been disqualified, and these for good and sufficient reasons, the remaining ones being of such excellence that they easily surpassed the new standard established. On the other hand, there have been exhibits of exceedingly rare and finely cultivated plants, which have been shown previously, though in smaller specimens, and these being judged by the new standard, have been awarded prizes for superior cultivation, which has been in accordance with the rules, but has resulted in two instances in the *gardeners* of the exhibitors declining to continue to exhibit.

It is also to be regretted that our exhibitions the past year have not been as large as formerly, and this brings us face to face with the question: Do our exhibitors show for prizes or for the love, encouragement, and advancement of horticulture? The advocates of that class whose aim is chiefly the advancement of horticulture, are, we regret to say, altogether out of proportion to those who exhibit for what they can get out of it in dollars and cents, and when the expense of carriage to and from the hall of large collections is taken into consideration, it is not to be wondered at, that the item of cost has to be considered.

As the exhibitions the coming year will be more or less interrupted owing to our removal to our new quarters, and as the expenditures in all departments will call for more or less extra expense—your Committee would ask that if deemed advisable in 1902, a prize or prizes be offered to the gardener or gardeners who during that year receive the greatest number of First Prizes.

It is a matter of congratulation that our exhibitors are endeavoring to make their exhibits instructive as well as pleasing to those who visit our Halls, and in this connection we would cite as examples the exhibits of the following:—

James E. Rothwell (John Mutch, gardener) on January 6 exhibited six varieties of the, so-called, yellow *Cypripedium insigne*, viz:

Ernestii,	*Laura Kimball*,
Sanderæ,	*Sanderianum*,
Willie Millie Dow,	*Youngianum*.

Ernesti. Laura Kimball. Sanderæ. Sanderianum. Youngianum. Willie Millie Dow.

Display of Cypripedium insigne – yellow varieties

By James E. Rothwell.

Display of Cypripedium insigne varieties
By Oakes Ames.

E. V. R. Thayer (E. O. Orpet, gardener) on Oct. 6:

Cattleya × *Thayeriana* (*C. intermedia* × *C. labiata Schrœderæ* var. *alba*), two plants

Cattleya × *Thayeriana* var. *superba* (*C. intermedia* × *C. labiata Schrœderæ* var. *alba.*), one plant

Laelia × *nigrescens* (*L. pumila* × *L. tenebrosa*) two plants

" × *juvenilis* var. *superba* (*L. pumila* var. *praestans* × *L. Perrinii*), three plants

Laelio-Cattleya C. G. Roebling, syn. *L.-C. violetta*, (*C. labiata* var. *Gaskelliana* × *L. purpurata*), one plant

Laelio-Cattleya Bletchleyensis (*C. Warscewiczii* (syn. *gigas*) × *L. tenebrosa*), one plant

Mrs. F. L. Ames (W. N. Craig, gardener) on Nov. 3:

The Langwater and Sander varieties of *Cypripedium* × *Olivia* var. *Miss Minnie Ames* (*C. niveum* × *C. Curtisii*—Ames) and (*C. Curtisii* × *C. niveum*—Sander)

Cypripedium × *Krishna* var. (*C. tonsum* × [*C. insigne* var. *Sanderæ*), seven plants

Cypripedium × (*C. tonsum* × *C. Charlesworthii*), two plants.

Cypripedium × *Leeanum* var. *pallida* (*C. insigne* var. *Sanderæ* × *C. Spicerianum*), one plant

Oakes Ames, (Robert M. Grey, gardener) on Nov. 24:

Cypripedium insigne var. *aureum*
" " " *Amesianum*
" " " *Ballæ*
" " " *citrinum*
" " " *Dorothy*
" " " *Ernestii*
" " " *Gilmoreianum*
" " " *Harefield Hall* (type)
" " " " " var. *Baron Schrœder*
" " " *Lutwichianum*
" " " *Laura Kimball*
" " " *Sanderæ*
" " " " *Hardy's* var. (true)
" " " *Willie Millie Dow*

Up to the time of Mr. Rothwell's exhibit it had been impossible for your Committee to get more than one variety of the so-called yellow *Cypripedium insigne* submitted for award at one time, whereby the different colorations and structure of the flowers could be compared, it being claimed by many that they were all alike, but a careful comparison proved the contrary.

In Mr. Thayer's exhibit was shown the desirable results which could be obtained by a judicious selection of parents for hybrids, and to what extent they vary, even those coming from the same seed pod showing great variation, and Mr. Thayer is to be congratulated in having such an able gardener who can apply scientific methods to obtain such results.

Of Mrs. Ames's exhibit the same may be said as of the foregoing, the plants exhibited showing great variety though having the same parentage, and they also showed that the late William Robinson had accomplished good work which others are ably bringing to maturity.

Mr. Ames's exhibit was as unique, as well as complete, as it was possible to make it, and from an educational standpoint it easily took first honors. In addition to the plants heretofore mentioned the exhibit also included a plant of *Cypripedium* × *Simonii* var. *obscuram* (natural hybrid) and *C.* × *Gravesiæ* (*C. niveum* × *C. Argus*) the latter receiving a First Class Certificate of Merit.

The plants of *Cattleya Trianæ* exhibited by Bayard Thayer (James Brydon, gardener) on Feb. 3 and Feb. 10 were marvellous specimens of superior cultivation, bearing from twenty-five to thirty flowers each.

Feb. 24, Walter P. Winsor exhibited *Dendrobium nobile*, Burford var., which was awarded a First Class Certificate of Merit with the request that it be shown again in 1901.

SPRING EXHIBITION.

March 20, 21, 22 and 23.

This was somewhat disappointing in some of the entries as the early warm weather had brought some varieties forward earlier than usual: so that the Cyclamens were past their best.

Cattleya Trianae
By Bayard Thayer.

March 31, Col. Charles Pfaff exhibited a remarkable specimen of *Dendrobium fimbriatum* var. *oculatum*, showing superior cultivation.

MAY EXHIBITION.

May 5.

At the May Exhibition, C. H. Souther submitted a new and improved variety of *Chrysanthemum Leucanthemum*, for which a First Class Certificate of Merit was awarded, and J. S. Bailey (William Donald, gardener) exhibited a new palm,—*Kentia Sanderiana*, receiving a Silver Medal for the same, it being considered an exceptionally fine variety.

May 19 Arthur Hunnewell exhibited three plants of Schizanthus which were fine examples of cultural skill, and obtained a First Class Certificate of Merit.

RHODODENDRON SHOW.

June 12 and 13.

At the Rhododendron Exhibition H. H. Hunnewell showed *Miltonia vexillaria* var. H. H. Hunnewell, a superb form, having all of its segments deeply colored, and Bayard Thayer showed a specimen plant of *Cattleya Warscewiczii* (syn. *gigas*) with five spikes bearing thirty-five flowers; both were awarded Silver Medals.

Saturday, July 14, H. Dumaresq exhibited specimen Hydrangeas, capturing all the prizes competed for in this class, as he did last year.

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

September 5 and 6.

The Annual Exhibition, Sept. 5 and 6, was smaller than in years past, many of the classes being without exhibits. It has been suggested that at this Exhibition there be a third prize offered for Collection of Greenhouse Plants (No. 443). At this Exhibition, a new introduction by Oakes Ames, of Caladium Oakes Ames was shown for the first time and received Honorable Mention.

Oct. 20 J. E. Rothwell (J. Mutch, gardener) exhibited *Cattleya* × *Maroni* (*C. velutina* × *C. aurea*) a Continental hybrid of rare merit, being not only pleasing in color, but extremely fragrant.

CHRYSANTHEMUM SHOW.

NOVEMBER 6, 7, 8 AND 9.

At the Chrysanthemum Exhibition, Nov. 6 to 9, inclusive, there were plants of this flower exhibited that exceeded any similar exhibit heretofore given, Mrs. B. P. Cheney (John Barr, gardener) taking the first place easily, the quality of the plants being such that they were shown at Newport and Providence the next week, competing successfully against plants fresh from local establishments after three transfers and journeys of many miles each.

The varieties which won for Mrs. Cheney first prizes in their respective classes were

Display of twelve plants, any or all classes:

Kate Broomhead.	Mutual Friend.
Lady Isabel.	Peter Kay.
Louis Boehmer.	Red Warrior.
Mrs. E. B. Freeman.	Shiloh.
Mrs. F. A. Constable.	Silver Cloud.
Mrs. J. G. Breer.	The Bard.

Three Reflexed, first prize:

Marion Henderson.	Red Warrior.
Mrs. J. Lewis.	

Three Reflexed, second prize:

Black Hawk.	Mrs. J. G. Breer.
Edith Smith.	

Specimen Reflexed:

First prize, Lady Hanham.
Second prize, Arethusa.

Three Japanse Incurved:

Georgiana Pitcher.	Mrs. H. Weeks.
Louis Boehmer.	

Specimen Incurved:

First prize, Golden Trophy.
Second prize, Georgiana Bramhall.

Third prize, Mongolian Prince.

Specimen Pompon: Savanah.

There were also shown by R. & J. Farquhar plants of the new Begonia Caledonia, a white sport from Begonia Gloire de Lorraine; while presenting a striking contrast it will have hard work to supplant the older variety.

Dr. C. G. Weld (Kenneth Finlayson, gardener,) exhibited three splendid specimens of *Erica Wilmoreana* and an excellent display of Chrysanthemums grown to single stem and bloom, which upheld the reputation that he has of sending none but the very finest and cleanest plants for exhibition.

It is to be regretted in connection with this exhibition that since the offering of prizes known as the Henry A. Gane Memorial Fund prizes, there have been no competitors. Upon diligent enquiry among Chrysanthemum experts, the opinion seems to be quite unanimous that the varieties originated by the late Henry A. Gane, are much more adapted to the production of *extra fine flowers* than to even fairly good specimen plants. Will not some of our growers try and prove the contrary, for surely we could imagine nothing finer than a well grown specimen plant of Mrs. Jerome Jones bearing its large and handsome flowers in profusion.

The Committee have again to express their sincere thanks to Oakes Ames for his assistance in many cases where questions of a scientific nature have arisen regarding exhibits, and for his generous gift of the collection of water color paintings, to be known as the "Ames Collection of Colored Drawings of Orchids."

Amount appropriated for Prizes and Gratuities .		$2,000 00
Prizes and Gratuities have been awarded amounting to	$1,609 00	
Estimated cost of Medals, . .	229 60	
		1,838 60
Leaving an unexpended balance of . .		$161 40

Respectfully submitted,

WM. WALLACE LUNT,
JAMES WHEELER,
WM. J. MARTIN,
ARTHUR H. FEWKES,
ROBERT CAMERON.
} *Committee on Plants.*

PRIZES AND GRATUITIES AWARDED FOR PLANTS. 1900.

JANUARY 6.

PRIMULA SINENSIS. — Six plants in not less than six-inch pots:

First, Mrs. John L. Gardner	$4 00
Second, Mrs. John L. Gardner	3 00
Third, Mrs. B. P. Cheney	2 00

PRIMULA STELLATA. — Six plants in not less than six-inch pots:

First, Mrs. B. P. Cheney	3 00
Second, Mrs. John L. Gardner	2 00

PRIMULA OBCONICA HYBRIDS. — Six plants in not less than six-inch pots:

First, Mrs. B. P. Cheney	4 00
Second, Mrs. B. P. Cheney	3 00
Third, Mrs. John L. Gardner	2 00

Gratuities:—

R. & J. Farquhar, Begonia Gloire de Lorraine var. compacta	6 00
J. W. Howard, Display of Primulas	2 00
Dr. C. G. Weld, Display of seedling Amaryllises	1 00

FEBRUARY 3.

Gratuities:—

Bayard Thayer, Specimen plant of *Cattleya Trianæ*	3 00
Mrs. John L. Gardner, Fourteen plants of *Primula Sinensis* var. *alba flore pleno*	2 00

FEBRUARY 10.

Gratuities:—

Edward Whitin, *Cattleya Trianæ* var.	2 00
Walter Hunnewell, *Oncidium Cavendishianum* var.	2 00

FEBRUARY 17.

Gratuities:—

Bussey Institution, Syringa (Lilac) var. Charles X	1 00
H. A. Wheeler, Display of Orchids, *Coelogyne cristata* and *Ondontoglossum Rossii* var. *majus*	1 00

MARCH 10.

Gratuity:—

H. A. Wheeler, Display of Orchids, *Cattleya Schrœderæ* and *Dendrobium Wardianum*.	1 00

MARCH 17.

Gratuity:—

J. E. Rothwell, *Masdevallia* × *Henriettæ*	3 00

SPRING EXHIBITION.

MARCH 20, 21, 22, AND 23.

Theodore Lyman Fund.

INDIAN AZALEAS. — Specimen plant, named:	
First, H. H. Rogers	$10 00
Second, Dr. C. G. Weld	8 00
Third, Dr. C. G. Weld	5 00
ERICAS. — Six, not less than three species:	
First, Dr. C. G. Weld	6 00
Second, Bussey Institution	4 00

Society's Prizes.

ORCHID. — Single plant:	
First, Bayard Thayer	12 00
Second, Mrs. John C. Whitin	10 00
STOVE OR GREENHOUSE PLANT. — Specimen, in bloom, other than Azalea or Orchid, named:	
First, Dr. C. G. Weld	8 00
Second, Mrs. John L. Gardner	6 00
HARDWOODED GREENHOUSE PLANTS. — Four, in bloom:	
First, Dr. C. G. Weld	10 00
Second, Mrs. John L. Gardner	8 00
CLIMBING ROSE. — Specimen plant, in bloom:	
First, C. H. Souther	8 00
Second, C. H. Souther	6 00
HARDY FLOWERING DECIDUOUS SHRUBS, FORCED. — Four, of four distinct species, named:	
First, Mrs. John L. Gardner	6 00
Second, Bussey Institution	4 00
HARDY PRIMROSES. — Twelve plants of distinct varieties:	
First, Mrs. John L. Gardner	6 00
Second, Mrs. John L. Gardner	4 00
HARDY POLYANTHUSES. — Twelve plants of distinct varieties:	
First, Dr. C. G. Weld	6 00
Second, Mrs. John L. Gardner	4 00
Third, Mrs. John L. Gardner	2 00
CYCLAMENS. — Ten plants:	
First, Mrs. B. P. Cheney	15 00
Second, Mrs. B. P. Cheney	12 00
Ten plants in not over seven-inch pots:	
First, Jason S. Bailey	8 00
Second, Jason S. Bailey	6 00
Third, Mrs. B. P. Cheney	4 00

Single plant:	
First, Mrs. B. P. Cheney	5 00
Second, C. H. Souther	4 00
CINERARIAS. — Six varieties:	
First, C. H. Souther	10 00
Second, Mrs. John L. Gardner	8 00
Third, Dr. C. G. Weld	6 00
Three varieties:	
First, C. H. Souther	6 00
Second, Mrs. John L. Gardner	5 00
Third, Dr. C. G. Weld	4 00
Single plant:	
First, Mrs. John L. Gardner	4 00
Second, C. H. Souther	3 00
Third, Dr. C. G. Weld	2 00
HYACINTHS. — Twelve named varieties in pots, one in each pot:	
First, Dr. C. G. Weld	6 00
Second, Mrs. John L. Gardner	4 00
Third, Mrs. John L. Gardner	3 00
Six named varieties in pots, one in each pot:	
First, Dr. C. G. Weld	5 00
Second, Mrs. John L. Gardner	4 00
Single named bulb, in pot:	
First, Dr. C. G. Weld	2 00
Second, Mrs. John L. Gardner	1 00
Three pans, not to exceed twelve inches, ten bulbs of one variety in each pan:	
First, Dr. C. G. Weld	6 00
Second, Mrs. John L. Gardner	4 00
Third, Mrs. John L. Gardner	3 00
Two pans, not to exceed twelve inches, ten bulbs of one variety in each pan:	
First, Dr. C. G. Weld	4 00
Second, Dr. C. G. Weld	3 00
Third, Mrs. John L. Gardner	2 00
Single pan, not to exceed twelve inches, with ten bulbs of one variety:	
First, Mrs. John L. Gardner	3 00
Second, Dr. C. G. Weld	2 00
TULIPS. — Six eight-inch pans, nine bulbs of one variety in each:	
First, Dr. C. G. Weld	4 00
Second, William S. Ewell & Son	3 00
Third, E. S. Converse	2 00
Three eight-inch pans, nine bulbs of one variety in each:	
First, Dr. C. G. Weld	3 00
Second, William S. Ewell & Son	2 00
Third, E. S. Converse	1 00

Three ten-inch pans, twelve bulbs of one variety in each:

First, Dr. C. G. Weld	5 00
Second, Dr. C. G. Weld	4 00
Third, E. S. Converse	3 00

POLYANTHUS NARCISSUS. — Four seven-inch pots, four bulbs in each, distinct varieties:

First, Dr. C. G. Weld	4 00
Second, Dr. C. G. Weld	3 00
Third, Mrs. John L. Gardner	2 00

JONQUILS. — Six pots or pans, not exceeding eight inches, the number of bulbs in each to be at the discretion of the grower:

First, Dr. C. G. Weld	4 00
Second, William S. Ewell & Son	3 00
Third, William S. Ewell & Son	2 00

NARCISSUSES. — Six eight-inch pans, distinct varieties, single or double:

First, Harry S. Rand	4 00
Second, Dr. C. G. Weld	3 00

Three eight-inch pans:

First, Dr. C. G. Weld	3 00
Second, Harry S. Rand	2 00

LILIUM LONGIFLORUM. — Four pots, not exceeding ten inches:

First, E. N. Pierce & Son	10 00
Second, E. N. Pierce & Son	8 00

LILIUM HARRISII. — Four pots, not exceeding ten inches:

First, Dr. C. G. Weld	10 00

LILY OF THE VALLEY. — Six pots or pans, not exceeding eight inches:

First, Bussey Institution	4 00
Second, Bussey Institution	3 00

CROCUSES. — Three boxes, each eight by twenty inches, three distinct varieties:

First, William S. Ewell & Son	3 00
Second, Bussey Institution	2 00

FREESIAS. — Six pots or pans:

First, Dr. C. G. Weld	3 00
Second, Mrs. John L. Gardner	2 00
Third, J. Burnett	1 00

IXIAS. — Six pots or pans, in varieties:

First, Dr. C. G. Weld	5 00

TRITONIAS. — Six pots or pans in varieties:

First, Dr. C. G. Weld	5 00

ROMAN HYACINTHS. — Six eight-inch pans, ten bulbs in a pan:

First, Bussey Institution	3 00
Second, Dr. C. G. Weld	2 00
Third, William S. Ewell & Son	1 00

GENERAL DISPLAY OF SPRING BULBS. — All classes:

First, William S. Ewell & Son	25 00
Second, Dr. C. G. Weld	20 00

Gratuities:—

Mrs. B. P. Cheney, Display of Rose Magna Charta	5 00
H. H. Rogers, Rhododendron Camille de Rohan	3 00
James Comley, *Rhododendron Veitchii*	2 00
H. A. Wheeler, Specimen Azalea	2 00
Rea Brothers, *Primula Sieboldi*	3 00
E. S. Converse, Display of Cyclamens	3 00
Walter Hunnewell, *Begonia Gilsoni*	3 00
Mrs. John L. Gardner, *Cineraria stellata*	2 00
E. N. Pierce & Son, Display of *Lilium longiflorum*	2 00
Bussey Institution, Display of *Begonia Verschaffeltii*	2 00
James Comley, *Genista alba*	2 00
Walter Hunnewell, *Bougainvillea Sanderiana*	1 00
Norris F. Comley, Display of Violets	2 00
Bussey Institution, Display of Forced Native Plants	5 00

MAY 5.

PELARGONIUMS. — Six named Show or Fancy varieties, in not less than eight-inch pots, in bloom:

First, E. J. Mitton	10 00
Second, C. H. Souther	8 00

INDIAN AZALEAS. — Six plants, in pots, named:

First, Dr. C. G. Weld	8 00

Single specimen:

First, Dr. C. G. Weld	3 00
Second, Dr. C. G. Weld	2 00

CALCEOLARIAS. — Six varieties, in pots:

First, Mrs. B. P. Cheney	10 00
Second, Mrs. B. P. Cheney	8 00
Third, Dr. C. G. Weld	6 00

Single plant:

First, Mrs. B. P. Cheney	3 00
Second, Mrs. B. P. Cheney	2 00
Third, Mrs. B. P. Cheney	1 00

ORCHIDS. — Display, named:

First, J. E. Rothwell	12 00

AMARYLLISES. — Six pots, distinct varieties:

First, J. S. Bailey	8 00
Second, J. S. Bailey	6 00

Gratuity:—

Dr. C. G. Weld, Display of *Lilium longiflorum* and Streptocarpus	5 00

MAY 26.

Gratuity:—

E. J. Mitton, *Cattleya* × *Schilleriana* 1 00

RHODODENDRON EXHIBITION.

JUNE 12 AND 13 (*postponed from* JUNE 6 AND 7).

ORCHIDS. — Display, arranged for effect, with foliage plants, in a space eight feet by five feet:

First, J. S. Bailey 30 00
Second, J. E. Rothwell 25 00
Third, Mrs. John L. Gardner 20 00

Gratuities:—

H. A. Wheeler, *Odontoglossum lævе* var. *Reichenheimii* 1 00
Dr. C. G. Weld, Display of Pelargoniums 4 00
E. J. Mitton, " " " 5 00
Dr. C. G. Weld, Display of *Watsonia Ardernei* and *Cypripedium Lawrenceanum* 3 00

ROSE AND STRAWBERRY EXHIBITION.

JUNE 22 AND 23.

DECORATIVE PLANTS. — Group, named, arranged for effect, covering seventy-five square feet:

First, J. S. Bailey 30 00
Second, Mrs. John L. Gardner 25 00
Third, E. S. Converse 20 00

ORCHIDS. — Six plants, of six named varieties, in bloom:

First, J. E. Rothwell 15 00

Three plants, of three named varieties, in bloom:

First, J. E. Rothwell 10 00

TUBEROUS BEGONIAS. — Six pots of six varieties:

First, E. S. Converse 8 00

JUNE 30.

Gratuity:—

E. J. Mitton, *Cattleya gigas* 1 00

JULY 14.

HYDRANGEAS. — Pair in tubs:

First, H. Dumaresq 15 00
Second, H. Dumaresq 10 00

Single plant in tub or pot:

First, H. Dumaresq 5 00

ACHIMENES.—Six, in not over ten-inch pans or pots, of six varieties:

First, H. Dumaresq	5 00

Gratuity:—

H. Dumaresq, Specimen Hydrangea	3 00

AUGUST 11.

Gratuities:—

Edward Whitin, *Cattleya* × *Hardyana* var. *Robbiana*	3 00
W. J. Clemson, *Oncidium crispum*	1 00
Richard H. Kidder, *Ananassa sativa*	1 00

AUGUST 18

OUVIRANDRA FENESTRALIS:

First, E. S. Converse	6 00
Second, Mrs. John L. Gardner	4 00

Gratuity:—

E. S. Converse, *Calomba aquatica*	2 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

SEPTEMBER 5 AND 6.

PALMS.—Pair, in pots or tubs not more than twenty-four inches in diameter:

First, J. S. Bailey	12 00

Pair, in pots not more than fourteen inches in diameter:

First, Dr. C. G. Weld	8 00
Second, Mrs. John L. Gardner	6 00

GREENHOUSE PLANTS.—Collection containing foliage plants of all descriptions, not to exceed forty plants, in pots or tubs:

First, Mrs. John L. Gardner	40 00
Second, J. S. Bailey	30 00

Six Greenhouse and Stove plants of different named varieties, two Crotons admissible:

First, Dr. C. G. Weld	25 00
Second, Mrs. John L. Gardner	20 00
Third, J. S. Bailey	15 00

TABLE DECORATION.—For fifteen covers, living plants, in one receptacle, only one entry admissible:

First, E. J. Mitton	10 00

FLOWERING GREENHOUSE PLANT.—Single specimen, named:

First, J. S. Bailey	8 00
Second, Dr. C. G. Weld	6 00

CALADIUMS.—Six named varieties:

First, Col. Charles Pfaff	8 00
Second, Col. Charles Pfaff	6 00

FERNS.—Specimen, other than Tree Fern:

First, J. S. Bailey	4 00
Second, W. H. Lincoln	3 00

LYCOPODS.—Four named varieties:

First, Dr. C. G. Weld	5 00

DRACÆNAS.—Six named varieties:

First, J. S. Bailey	8 00
Second, Dr. C. G. Weld	6 00

CROTONS.—Twenty-five plants, not less than eighteen named varieties, in not less than six-inch pots:

First, J. S. Bailey	12 00
Second, E. J. Mitton	10 00
Third, W. H. Lincoln	8 00

Six named varieties, in not less than eight-inch pots:

First, W. H. Lincoln	10 00

CYCAD.—Single plant, named:

Second, Dr. C. G. Weld	8 00
Third, J. S. Bailey	6 00

Gratuities:—

Mrs. John L. Gardner, Display of *Gesneria bulbosa*	3 00
Arthur F. Estabrook, Display of Adiantums and Begonias	3 00

SEPTEMBER 15.

Gratuity:—

H. Carstens, *Oncidium ornithorhynchum*	1 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

SEPTEMBER 27 AND 28.

DECORATIVE PLANTS.—Display, not less than forty, not to exceed three feet in height, to be arranged by the Committee:

First, Mrs. John L. Gardner	20 00
Second, E. S. Converse	15 00

OCTOBER 6.

Gratuities:—

Oakes Ames, Display of Orchids	3 00
H. A. Wheeler, " " "	2 00

CHRYSANTHEMUM EXHIBITION.

NOVEMBER 6, 7, 8, AND 9.

CHRYSANTHEMUMS.—Display of twelve named plants, any or all classes, distinct varieties:

First, Mrs. B. P. Cheney	60 00
Third, E. S. Converse	40 00
Display of ten named plants, any or all classes, distinct varieties, in not exceeding nine-inch pots:	
Second, E. S. Converse	25 00
Three Japanese Incurved:	
First, Mrs. B. P. Cheney	12 00
Three Reflexed, distinct named varieties:	
First, Mrs. B. P. Cheney	12 00
Second, Mrs. B. P. Cheney	10 00
Four Anemone Flowered, distinct named varieties:	
First, E. S. Converse	8 00
Specimen Incurved, named variety:	
First, Mrs. B. P. Cheney	6 00
Second, Mrs. B. P. Cheney	5 00
Third, Mrs. B. P. Cheney	4 00
Specimen Reflexed, named variety:	
First, Mrs. B. P. Cheney	6 00
Second, H. H. Rogers	5 00
Third, Mrs. B. P. Cheney	4 00
Specimen Anemone Flowered, named variety:	
Second, E. S. Converse	5 00
Specimen Pompon, named variety:	
First, Mrs. B. P. Cheney	4 00
Twelve plants, of twelve different varieties, grown to one stem and bloom, in not over six-inch pots, preference being given to plants not over three feet in height:	
First, Dr. C. G. Weld	8 00
Second, E. S. Converse	6 00
Third, H. Dumaresq	4 00
Six plants grown as above, but all of one color, Red:	
First, H. Dumaresq	4 00
Second, J. Nicol	3 00
Third, E. S. Converse	2 00
White:	
First, Dr. C. G. Weld	4 00
Second, J. Nicol	3 00
Third, E. S. Converse	2 00
Pink:	
First, H. Dumaresq	4 00
Second, Dr. C. G. Weld	3 00
Third, Dr. C. G. Weld	2 00

Yellow:

First, J. Nicol	4 00
Second, J. Nicol	3 00
Third, Dr. C. G. Weld	2 00

Any other color:

First, Dr. C. G. Weld	4 00
Second, Dr. C. G. Weld	3 00
Third, Dr. C. G. Weld	2 00

Six plants grown to bush form, in not over eight-inch pots, without stakes:

First, Francis Blake	8 00
Second, H. H. Rogers	6 00

Group arranged for effect, with palms and decorative foliage plants, limited to one hundred square feet:

First, Mrs. John L. Gardner	25 00

Gratuities:—

Dr. C. G. Weld, Display of Chrysanthemums grown to single stem	7 00
Dr. C. G. Weld, Display of *Erica Wilmoreana*	5 00
Lager & Hurrell, Summit, N. J., Display of Orchids	25 00
William W. Edgar, Display of Ferns, Crotons, etc.	8 00

NOVEMBER 17.

Gratuities:—

Mrs. F. L. Ames, Display of Orchids	3 00
H. Carstens, *Stanhopea oculata*	1 00

NOVEMBER 24.

Gratuity:—

H. A. Wheeler, *Zygopetalum Mackayi* var. *cærulescens*	2 00

DECEMBER 8.

ORCHIDS. — Six plants, named varieties, in bloom:

First, H. A. Wheeler	15 00

Three plants, named varieties, in bloom:

First, H. A. Wheeler	10 00
Second, Mrs. John L. Gardner	8 00

Single plant, in bloom:

First, H. A. Wheeler	5 00
Second, Mrs. John L. Gardner	4 00

Gratuities:—

W. J. Clemson, *Oncidium tigrinum*	1 00
E. S. Converse, Display of Poinsettias	6 00

SOCIETY'S GOLD MEDALS.

May 26. E. O. Orpet, for the best American Seedling Orchid, other than Cypripedium, exhibited during the year, *Sophro-Laelia laeta* var. *Orpetiana (L. pumila* × *S. grandiflora)*.

October 6. E. V. R. Thayer, Display of Cattleyas and Laelio-Cattleyas (American seedlings).

Cattleya × *Thayeriana (C. intermedia* × *C. labiata Schrœderæ alba)*, two plants.

Cattleya × *Thayeriana* var. *superba (C. intermedia* × *C. labiata Schrœderæ alba)*, one plant.

Laelia × *nigrescens (L. pumila* × *L. tenebrosa)*, two plants.

Laelia × *juvenilis*, var. *superba (L. pumila* var. *praestans* × *L. Perrinii)*, three plants.

Laelio-Cattleya × C. G. Roebling *(C. labiata* var. *Gaskelliana* × *L. purpurata)*, three plants.

Laelio-Cattleya × *Bletchleyensis (L. tenebrosa* × *C. Warscewiczii*, syn., *gigas)*, one plant.

SOCIETY'S SILVER MEDALS.

January 6. J. E. Rothwell, Display of yellow varieties of *Cypripedium insigne:*

C. insigne var. *Sanderæ.*
" " " *Sanderianum.*
" " " *Youngianum.*
" " " *Willie Millie Dow.*
" " " *Ernestii.*
" " " *Laura Kimball.*

January 13. Oakes Ames, for Cypripedium × Miss Evelyn Ames *(C.* × *Calypso* var. *superba* × *C.* × *Leeanum* var. *superba)* (American Seedling).

February 17. Oakes Ames, for *Cattleya Schrœderæ* var. *alba.*

" 24. J. E. Rothwell, for *Cypripedium* × *Leander (C. villosum* var. *aureum* × *C. Leeanum* var. *Lowii)*.

April 21. J. E. Rothwell, for *Laelia Jongheana.*

May 5. J. S. Bailey, for *Kentia Sanderiana* (new palm).

" 12. J. E. Rothwell, for *Cattleya* × *Schilleriana (C. Aclandiæ* × *C. guttata)*.

" 19. H. H. Hunnewell, for Superior Cultivation of *Cattleya Mossiæ* × and *C. Skinneri.*

Rhododendron Exhibition, June 12 and 13. H. H. Hunnewell, for *Miltonia vexillaria* var. *H. H. Hunnewell.*

" " " " Bayard Thayer, for superior cultivation of *Cattleya gigas* (thirty-five flowers).

Sophro-Laelia laeta var Orpetiana
By E. O. Orpet.

July 14. Oakes Ames for *Cypripedium* × *W. R. Lee* (*C. superbiens* × *C. Elliottianum*).

September 22. Oakes Ames, for *Cypripedium* × *Oakes Ames* (*C. Rothschildianum* × *C. ciliolare*).

November 3. Mrs. F. L. Ames, for Display of American Hybrid Cypripediums.

Cypripedium × *Olivia* var. *Miss Minnie Ames* (Langwater var. *C. niveum* × *C. tonsum*).

Cypripedium × *Olivia* var. *Miss Minnie Ames* (Sander var. *C. tonsum* × *C. niveum*).

Cypripedium × *Krishna* var.

(*C. tonsum* × *C. insigne* var. *Sanderæ*) seven plants.

Cypripedium × *Tonsum-Charlesworthii*.

(*C. tonsum* × *C. Charlesworthii*) two plants.

Cypripedium × *Leeanum*, var.

(*C. insigne*, var. *Sanderæ* × *C. Spicerianum*).

November 24. Oakes Ames, for Display of varieties of *Cypripedium insigne*:

Cypripedium insigne var. *aureum*.
" " " *Amesianum*.
" " " *Ballæ*.
" " " *citrinum*.
" " " *Dorothy*.
" " " *Ernestii*.
" " " *Gilmoreianum*.
" " " *Harefield Hall* (type).
" " " " " var. *Baron Schrœder*.
" " " *Lutwichianum*.
" " " *Laura Kimball*.
" " " *Sanderæ*.
" " " " (Hardy's var.)
" " " *Willie Millie Dove*.

November 24. Oakes Ames, for *Cypripedium insigne Harefield Hall* var. *Baron Schrœder*.

E. V. R. Thayer, second prize for best American Seedling Orchid, other than Cypripedium, exhibited during the year, *Cattleya* × *Thayeriana* (*C. intermedia* × *C. Schrœderæ* var. *alba*).

BRONZE MEDALS.

June 22. W. A. Manda, third prize for best American Seedling Orchid, other than Cypripedium, exhibited during the year, *Laelio-Cattleya* × *Bletchleyensis* (*C. gigas* × *L. grandis* var. *tenebrosa*).

December 29. Mrs. F. L. Ames, for superior cultivation of *Cypripedium* × *Charles Canham* (twenty-seven flowers).

FIRST CLASS CERTIFICATES OF MERIT.

January 6. J. E. Rothwell, for *Cypripedium insigne* var. *Sanderianum*.
" " J. E. Rothwell, for " " " *Youngianum*.
" " J. E. Rothwell, for " " " *Willie Millie Dow*.
" " Oakes Ames, for " " " *Sanderianum*.
" 13. Oakes Ames, for *Cypripedium* × *Marwoodi* (*C. niveum* × *C.* × *Harrisianum*).
January 20. J. E. Rothwell, for *Cypripedium* × *Koffmanianum* (*C. insigne* × *C. Boxallii*).
February 10. Bayard Thayer, for superior cultivation of *Cattleya Trianæ*.
" " Edward Whitin, for *Cattleya Trianæ* var. *Amesiana*.
" 24. Walter P. Winsor, for *Dendrobium nobile*, Burford var.
March 10. Oakes Ames, for *Cattleya intermedia* var. *alba*.
Spring Exhibition, March 20–23. Jackson Dawson, for hybrid Polyantha Rose Little Tot.
March 31. Col. Charles Pfaff, for *Dendrobium fimbriatum* var. *oculatum*.
May 5. C. H. Souther, for *Chrysanthemum Leucanthemum*.
" 19. Arthur Hunnewell, for superior cultivation of Schizanthus.
Annual Exhibition of Plants and Flowers, September 5 and 6. Oakes Ames, for *Cypripedium* × *Thorntonii* (*C. superbiens* × *C. insigne*).
September 15. H. A. Wheeler, for *Stanhopea Bucephalus* var. *guttata*.
" 22. Oakes Ames, for superior cultivation of *Epidendrum Godseffianum* (*E. Capartianum*).
" " Oakes Ames for superior cultivation of *Stelis Rodriguesii*.
October 20. James E. Rothwell, for *Cattleya* × *Maroni* (*C. velutina* × *C. aurea*).
Chrysanthemum Exhibition, November 6, 7, 8, and 9. R. & J. Farquhar, for Begonia Caledonia (white sport of Gloire de Lorraine).
November 17. Mrs. F. L. Ames, for *Laelio-Cattleya* × *Lady Rothschild* (*C. Warscewiczii* × *L. Perrinii*).
November 24. Oakes Ames, for *Cypripedium insigne* var. *Dorothy*.
" " Oakes Ames, for *Cypripedium* × *Gravesiæ* (*C. niveum* × *C. Argus*).
December 15. James E. Rothwell, for superior cultivation of *Odontoglossum* × *Andersonianum*.
December 29. Mrs. F. L. Ames, for superior cultivation of *Laelio-Cattleya Dighyano-Mossiæ* and *Cypripedium Sallierii* var. *aureum*.

HONORABLE MENTION.

January 6. Harvard Botanic Garden, for *Platyclinis uncata*.
February 10. Harvard Botanic Garden, for *Calla Pentlandii*.
Spring Exhibition, March 20–23. Yamanaka & Co., for Display of Japanese Plants.
April 21. Norris F. Comley, for seedling Iris, var. *lærigata*.
July 21. Oakes Ames, for Cattleya Rex.
Annual Exhibition of Plants and Flowers, September 5 and 6.
Oakes Ames, for Caladium Oakes Ames (new introduction).
Oakes Ames, for Display of seedling Caladiums.

REPORT

OF THE

COMMITTEE ON FLOWERS.

FOR THE YEAR 1900.

By J. WOODWARD MANNING, CHAIRMAN.

The season of 1900 has been fully as successful as those of past years, although somewhat devoid of the usual number of new exhibits that call for special mention. We have had to pass through a repetition of the unusual dry weather conditions that prevailed in 1899, which, of course, has had its effect to a more or less serious extent in some of the classes of exhibits.

SPRING EXHIBITION.

MARCH 20, 21, 22, AND 23.

At the Spring Exhibition the dearth of exhibits of forced Roses was very noticeable. Many of the scheduled prizes had no competition. The exhibitions of Carnations, however, were very good and the competition was quite close.

On April 5, a Silver Medal was awarded to David Monteith for his new Carnation, Beulah, a very promising variety, of rich pink color and with unusual vigor and strength in stem.

MAY EXHIBITION.

MAY 5.

On May 5, a Silver Medal was awarded to the Floral Exchange, Incorporated, Philadelphia, for the new rose, Queen of Edgely.

At the time of its exhibition this seemed very promising, in that the general effect was in shape and size that of the American Beauty, while the color was a soft pink. Other exhibits of the same rose, however, made later in the season, did not show the plant to as good advantage as the first.

RHODODENDRON SHOW.

JUNE 12 AND 13.

The Rhododendron Show, postponed from June 6 and 7, brought out the usual amount of competition and the trusses and variety in flowers were fully up to the usual standard.

PÆONY EXHIBITION.

JUNE 16.

This proved one of the noteworthy shows of the season. Competition was very brisk and the display of flowers was ample in quantity and of the highest possible quality. The indications are that the Pæony will remain one of our most popular flowers and its adaptability to varied uses was well shown in the staging of the exhibits and arrangements in the vases.

ROSE AND STRAWBERRY SHOW.

JUNE 22 AND 23.

At the Rose Show of June 22 and 23, we were unfortunate in the weather conditions, which had practically reproduced the same scarcity of desirable flowers as had occurred in the season of 1899. Although there was an abundance of flowers, they lacked that quality that is so essential to make an exhibition successful in every sense of the word. At this exhibition, Jackson Dawson brought and was awarded a Silver Medal for the rose, Lady Duncan, a cross in which *Rosa rugosa* is one of the parents, producing a flower of soft pink color and apparently borne in great profusion.

On June 30, the exhibition of *Iris Kæmpferi* and Delphiniums was perhaps as fine as has been seen for a number of years past.

On July 7, when Hollyhocks are usually shown, the exhibition failed to bring forth that competition that used to be a feature of

our exhibits, indicating that the Hollyhock disease has become so very widespread as to practically wipe out of existence those fine collections that formerly added so much to the exhibitions of the year. On this date Michael H. Walsh exhibited a Rose, a very fine cross between *Rosa Wichuraiana* and Bridesmaid, called Sweetheart, for which your Committee awarded a Silver Medal. In this rose there was united that prolific bloom with rich fragrance and fine form in bud and flower that go so far to make the ideal rose. The delicate flesh colored flowers, which contrast well against the glossy, finely cut foliage, render it apparently one of the finest of semi-prostrate roses that has been shown before the Society for many years.

On July 14, Kenneth Finlayson, gardener to Dr. C. G. Weld, exhibited flowers of *Gerbera Jamesonii*, a South African composite, which attracted much attention as it is very noteworthy in that it displays the most intense shade of crimson-scarlet, which color is so extremely rare in the compositæ. Your Committee awarded a First Class Certificate of Merit for this exhibit.

The exhibits of Gladioli on and after August 18, were unusually fine throughout their season. The spikes seemed to be displayed to far better advantage than ever before and the great range in color that was shown in their classes as well as the variety of classes shown indicated a renewed interest and suggests that the flower is by no means losing its popularity.

Commencing with August 25, Dahlias were shown and continued a feature of the exhibition until hard frost stopped the growth of the plants. The great variety shown, more particularly in the Show and Fancy sections, as well as the quality of individual flowers, was an indication of careful culture as well as evidence of the improvements that are constantly being effected in these classes. The increased quantity and variety of the Cactus, Single, and Decorative classes, evidenced the great strides that this section is making and that they soon will prove formidable rivals to the more stiff and formal flowers in the Show and Fancy sections. Their brilliancy and range in coloring unite with their graceful character to make this section a most promising one for the future.

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

September 5 and 6.

The exhibition of September 5 and 6, in which Dahlias were the principal feature, was very successful and received great attention from the public. While the unfortunate tendency toward stiff and formal arrangement of these flowers has not been entirely dropped by the exhibitors, there does seem to be a decided advance in this respect and probably this undesirable feature will cease to be evident hereafter.

CHRYSANTHEMUM SHOW.

November 6, 7, 8, and 9.

The Chrysanthemum Show of November 6 to 9 proved to be the crowning feature of the year's exhibition. Throughout the show the competition was very brisk and the quality of the flowers was fully as fine as has ever been seen at any of our exhibitions. The innovation whereby the Society's large vases were newly filled for new awards each day of the exhibition brought forth the strongest possible competition and the quality and artistic arrangement of the flowers could not be excelled. Several new exhibitors entered into the competition and their exhibits indicated the very highest skill in growing this class of flowers.

The year's exhibitions have been quite noteworthy in the repeated displays of Hardy Herbaceous Perennials, the interest in the class seeming to have taken a new lease of life, and throughout the season there were at frequent intervals, large and extremely interesting and beautiful exhibits made of this class of plants.

Your Committee has awarded during the year of 1900 $2,304.00, exclusive of the cost of Medals and First Class Certificates of Merit, which will be deducted from the balance of $227.50.

Respectfully submitted,

J. WOODWARD MANNING,

Chairman Flower Committee.

PRIZES AND GRATUITIES AWARDED FOR FLOWERS.

1900.

January 6.

PRIMULA SINENSIS.—Display of fifty or more individual blooms:	
First, Mrs. John L. Gardner	$2 00
Second, Walter E. Coburn	1 00
FREESIAS.—Vase of fifty spikes:	
First, William N. Craig	2 00
Second, Mrs. E. M. Gill	1 00
Gratuities:—	
W. N. Craig, Vase of Cypripediums	3 00
J. W. Howard, Vase of Carnations.	2 00
Mrs. E. M. Gill, Display	1 00

FEBRUARY 3.

ORCHIDS.—Display of named species and varieties, filling not less than twenty bottles:	
First, E. O. Orpet	15 00
Second, James E. Rothwell	10 00
VIOLETS.—Best collection of varieties, fifty blooms of each in a bunch:	
First, Norris F. Comley	4 00
CARNATIONS.—Display of cut blooms with foliage, not less than six varieties, in vases:	
First, M. A. Patten	8 00
CAMELLIAS.—Display of named varieties, cut flowers with foliage, not less than twelve blooms, in not less than six varieties:	
First, James Comley	4 00
Gratuities:—	
H. A. Wheeler, Display of Orchids	4 00
Mrs. A. W. Spencer, Display of Orchids and Violets	2 00
James Comley, Display of Violets	2 00
John L. Bird, *Acacia pubescens*	2 00
W. E. Coburn, Display of Primulas	2 00
Norris F. Comley, Pansies	1 00
James Anderson, Narcissus	1 00
Mrs. E. M. Gill, Display	1 00

FEBRUARY 10.

Gratuity:—	
James Comley, Violets	2 00

FEBRUARY 24.

Gratuities:—

A. A. Thorndike, Pansies	1 00
Mrs. E. M. Gill, Vase of Flowers	1 00
James Comley, Display	3 00

MARCH 3.

Gratuity:—

James Comley, Display	3 00

MARCH 10.

Gratuities:—

L. E. Marquisee, Syracuse, N. Y., Vase of Carnation The Marquis	2 00
M. A. Patten, Display of Carnations	3 00
D. Carmichael, Two Vases of Carnations	2 00
C. W. Ward, Display	5 00
James Comley, "	3 00
John Anderson, "	1 00

MARCH 17.

Gratuity:—

J. E. Rothwell, *Phalænopsis grandiflora*	2 00

SPRING EXHIBITION.

MARCH 20, 21, 22 and 23.

HYBRID PERPETUAL ROSES.—Twelve blooms in not less than four named varieties:

First, C. H. Souther	12 00
Second, Col. Charles Pfaff	10 00

Six blooms, not less than three named varieties:

First, Col. Charles Pfaff	6 00
Second, C. H. Souther	5 00

TENDER ROSES IN VASES.—Twelve blooms of American Beauty:

First, F. R. & R. M. Pierson, Tarrytown, N. Y.	15 00

Twenty-five blooms of The Bride:

First, W. H. Elliott	10 00

Twenty-five blooms of Bridesmaid:

First, W. H. Elliott	10 00

Twenty-five blooms of Meteor:

First, W. H. Elliott	10 00

Vase of fifty blooms, assorted varieties:

First, J. W. Howard	20 00
Second, Miss M. S. Walker	16 00

CARNATIONS.—Vase of one hundred cut blooms, with foliage, not less than six varieties:

First, M. A. Patten	8 00

Second, Col. Charles Pfaff	6 00
Third, J. W. Howard	4 00
Twenty-five blooms of any named Crimson variety:	
First, M. A. Patten, for Ferdinand Mangold	3 00
Twenty-five blooms of any named Dark Pink variety:	
First, M. A. Patten, for Mrs. F. Joost	3 00
Twenty-five blooms of any named Light Pink variety:	
First, Briarcliffe Greenhouses, Tarrytown, N. Y, for Mrs. James Dean	3 00
Twenty-five blooms of any named Scarlet variety:	
First, Briarcliffe Greenhouses, for G. H. Crane	3 00
Second, M. A. Patten, for G. H. Crane	2 00
Twenty-five blooms of any named White variety:	
First, Briarcliffe Greenhouses, for White Cloud	3 00
Second, M. A. Patten, for White Cloud	2 00
Twenty-five blooms of any named Yellow Variegated variety:	
First, Briarcliffe Greenhouses, for Golden Nugget	3 00
Twenty-five blooms of any named White Variegated variety:	
First, Briarcliffe Greenhouses, for Mrs. G. M. Bradt	4 00
Second, M. A. Patten, for Mrs. G. M. Bradt	3 00
PANSIES.—Forty-eight blooms, not less that twenty-four varieties, in flat dishes:	
First, W. C. Ward	3 00
Second, W. C. Ward	2 00
VIOLETS.—Bunch of one hundred blooms of Lady Hume Campbell:	
First, Norris F. Comley	3 00
Bunch of one hundred blooms of Marie Louise:	
First, Norris F. Comley	3 00
Bunch of one hundred blooms of any other double variety:	
First, Norris F. Comley	3 00
Bunch of one hundred blooms of any single variety:	
First, Norris F. Comley, for Princess of Wales	3 00
Second, Norris F. Comley, for California	2 00

Gratuities:—

J. W. Howard, Vase of Roses	5 00
Col. Charles Pfaff, Display of Roses	3 00
George M. Anderson, Vase of Carnations	2 00
James Comley, Violets and Camellias	5 00
J. W. Howard, Vase of Antirrhinums	3 00
M. R. Cushing, Antirrhinums	1 00
E. N. Pierce & Sons, Boston Market Mignonette	2 00
H. A. Wheeler, Display of Orchids	3 00
James Comley, General Display	6 00
Charles H. Souther, Display	3 00
Mrs. E. M. Gill, "	2 00

APRIL 7.

Gratuities:—

J. E. Rothwell, Display of Orchids	2 00
Mrs. E. M. Gill, Display	2 00

APRIL 21.

Gratuity:—

Mrs. E. M. Gill, Display	2 00

APRIL 28.

Gratuities:—

James Comley, Rhododendrons	4 00
Mrs. E. M. Gill, Display	1 00

MAY 5.

TULIPS. — Forty-eight blooms, not less than twelve named varieties:	
First, Edward Powell	4 00
HARDY NARCISSUSES. — Collection of fifty vases of not less than ten named varieties:	
First, Dr. C. G. Weld	8 00
Second, Edward Powell	6 00
PANSIES. — Forty-eight blooms, not less than twenty-four varieties, in flat dishes:	
Second, Mrs. E. M. Gill	3 00

Gratuities:—

Edward Powell, Display of Tulips	2 00
Norris F. Comley, Japan Irises	1 00
H. A. Wheeler, Display of Orchids and Gloxinias	3 00
James Comley, Display	5 00
Mrs. E. M. Gill, "	1 00

MAY 19.

Gratuities:—

Edward Powell, Vase of Carnations	1 00
F. O. Willard, Carnations and Antirrhinums	1 00
Edward Powell, Display of Tulips and Pansies	2 00
Blue Hill Nursery, Herbaceous Plants	8 00
Edward Powell, Display	3 00
Mrs. E. M. Gill, "	1 00

MAY 26.

Gratuities:—

Dr. C. G. Weld, Display	3 00
Mrs. E. M. Gill, "	1 00

JUNE 2.

Gratuities:—

T. C. Thurlow, Tree Pæonies, Azaleas, and other shrubs	3 00
Mrs. E. M. Gill, Cut Flowers	1 00

JUNE 9.

Gratuities:—

H. H. Hunnewell, Rhododendrons	5 00
James Anderson, Tree Pæonies	3 00
Charles W. Parker, Vase of Iris	1 00
Mrs. E. M. Gill, Display	1 00

RHODODENDRON EXHIBITION.

JUNE 12 AND 13 (POSTPONED FROM JUNE 6 AND 7).

H. H. Hunnewell Fund.

RHODODENDRONS.—Twelve distinct varieties of unquestioned hardiness, named:	
First, Mrs. John L. Gardner	20 00
Six distinct varieties, of unquestioned hardiness, named:	
First, Mrs. B. P. Cheney, Sr.	10 00
Six tender varieties, named:	
Second, Mrs. John L. Gardner	4 00
Single Truss of any tender variety, named:	
First, Mrs. John L. Gardner	2 00
HARDY AZALEAS FROM ANY OR ALL CLASSES.—Fifteen varieties, one vase of each:	
First, T. C. Thurlow	8 00
Twelve varieties, one vase of each:	
First, T. C. Thurlow	4 00
Six varieties, one vase of each:	
First, Mrs. John L. Gardner	3 00
Cluster of trusses:	
First, T. C. Thurlow	2 00

Society's Prizes.

PÆONIA OFFICINALIS.—Collection of named varieties:	
Second, T. C. Thurlow	4 00
TREE PÆONIES.—Collection of single and double varieties, named:	
First, W. A. Jeffries	6 00
GERMAN IRISES.—Thirty-six vases of three trusses each, of not less than twelve varieties:	
First, Mrs. John L. Gardner	4 00
Third, Rea Brothers	2 00
HARDY PYRETHRUMS.—Collection of not less than six double varieties:	
First, Dr. C. G. Weld	5 00
Display of thirty bottles, Single and Anemone Flowered:	
First, Dr. C. G. Weld	3 00
Second, Rea Brothers	2 00

ORIENTAL POPPIES. — Display:

First, Harry Seaton Rand	3 00
Second, Walter J. Clemson	2 00
Third, Dr. C. G. Weld	1 00

AQUILEGIAS. — Collection, twenty-five vases:

Second, William C. Winter	2 00
Third, W. A. Jeffries	1 00

VASE OF FLOWERS:

First, Mrs. E. M. Gill	4 00
Second, Miss Hattie B. Winter	3 00

Gratuities:—

H. H. Hunnewell, Named Rhododendrons	30 00
Mrs. B. P. Cheney, Sr., Collection of Rhododendrons	20 00
Mrs. John L. Gardner, Rhododendrons	7 00
Dr. C. G. Weld, "	5 00
William H. Spooner, Collection of Roses	1 00
M. A. Patten, Two Vases of Carnations	8 00
James Comley, *Lilium longiflorum*	3 00
Blue Hill Nursery, Hardy Perennials	3 00
Rea Brothers, " "	2 00
Walter J. Clemson, Collection	6 00
T. C. Thurlow, "	3 00
Mrs. E. M. Gill, Display	3 00
Charles W. Parker, "	1 00

PÆONY EXHIBITION.

JUNE 16.

HERBACEOUS PÆONIES. — Collection of named varieties, double:

First, Dr. C. G. Weld	12 00
Second, Mrs. John L. Gardner	10 00
Third, George Hollis	8 00

Collection of named varieties, single:

First, Mrs. John L. Gardner	6 00
Third, George Hollis	4 00

Vase of blooms on long stems, arranged for effect in the Society's large China vases:

First, Dr. C. G. Weld	10 00
Second, Mrs. John L. Gardner	8 00
Third, George Hollis	6 00
Fourth, W. J. Clemson	4 00

FOXGLOVES. — Twelve spikes:

Second, W. J. Clemson	2 00

Gratuities:—

Mrs. E. M. Gill, Vase of *Lilium umbellatum*	2 00
W. H. Spooner, Collection of Roses	1 00

Rea Brothers, Pyrethrums, etc.	4 00
Dr. C. G. Weld, Garden Pinks	2 00
W. J. Clemson, Display	3 00
Mrs. John L. Gardner, Display	2 00
Mrs. E. M. Gill, "	2 00
Blue Hill Nursery, "	2 00
R. P. Struthers, "	1 00

ROSE AND STRAWBERRY EXHIBITION.

JUNE 22 AND 23.

Special Prizes, Theodore Lyman Fund.

HARDY ROSES.—Twenty-four distinct named varieties, three of each variety:

First, Estate of Joseph S. Fay	25 00
Second, Estate of Joseph S. Fay	20 00

Society's Prizes.

Sixteen named varieties, three of each variety:	
First, Estate of Joseph S. Fay	15 00
Twelve named varieties, three of each:	
First, Dr. C. G. Weld	10 00
Second, Estate of Joseph S. Fay	8 00
Six named varieties, three of each:	
First, Estate of Joseph S. Fay	6 00
Second, Mrs. O. S. Paige	4 00
Three named varieties, three of each:	
First, Estate of Joseph S. Fay	3 00
Second, Dr. C. G. Weld	2 00
Third, Mrs. R. M. Clark	1 00
Twenty-four named varieties, one of each:	
First, Mrs. R. M. Clark	10 00
Second, Estate of Joseph S. Fay	8 00
Third, Mrs. John L. Gardner	6 00
Eighteen named varieties, one of each:	
First, Mrs. O. S. Paige	8 00
Second, Estate of Joseph S. Fay	6 00
Twelve named varieties, one of each:	
First, Dr. C. G. Weld	6 00
Second, Estate of Joseph S. Fay	4 00
Third, Mrs. R. M. Clark	2 00
Six named varieties, one of each:	
First, Estate of Joseph S. Fay	4 00
Second, Dr. C. G. Weld	3 00

Twenty-four blooms of Madame Gabriel Luizet:
First, Estate of Joseph S. Fay 8 00
Second, Dr. C. G. Weld 6 00
Third, Mrs. O. S. Paige 4 00
Six blooms of John Hopper:
First, Dr. C. G. Weld 3 00
Second, Mrs. O. S. Paige 2 00
Six blooms of Jubilee:
First, Estate of Joseph S. Fay 3 00
Six blooms of Merveille de Lyon:
First, Dr. C. G. Weld 3 00
Twelve of any other variety:
First, Estate of Joseph S. Fay 4 00
Second, Estate of Joseph S. Fay 3 00
Third, Estate of Joseph S. Fay 2 00
Best single bloom of any variety:
First, Estate of Joseph S. Fay 2 00

Moss Roses.—Six named varieties, three clusters of each:
First, Mrs. John L. Gardner 3 00
Second, Mrs. E. A. Wilkie 2 00

Hybrid Tea Roses.—Six named varieties, buds admissible:
First, Estate of Joseph S. Fay 3 00

General Display.—One hundred bottles of Hardy Roses, buds admissible:
First, Francis Blake 10 00
Second Dr. C. G. Weld 9 00
Third, Mrs. O. S. Paige 8 00
Fourth, W. J. Clemson 7 00
Fifth, Mrs. E. M. Gill 6 00
Sixth, Miss E. J. Clark, Pomfret, Conn. 5 00

Basket of Roses.—Arranged for effect:
First, Mrs. E. M. Gill 5 00

Sweet Williams.—Thirty spikes, not less than six varieties:
First, W. J. Clemson 4 00
Second, Anthony McLaren 3 00
Third, Mrs. John L. Gardner 2 00
Fourth, E. C. Lewis 1 00
Display, eighteen vases of three trusses each:
First, W. J. Clemson 4 00
Second, E. C. Lewis 3 00
Third, Blue Hill Nursery 2 00
Fourth, William C. Winter 1 00

Spanish Irises.—Display:
First, Rea Brothers 3 00
Second, W. J. Clemson 2 00

Vase of Flowers.—Best arranged:
First, Mrs. E. M. Gill 5 00
Second, Miss Hattie B. Winter 4 00

Gratuities:—

Estate of Joseph S. Fay, Display of Rose Madame Gabriel de Luizet	4 00
M. H. Walsh, Display of Rose Joseph S. Fay	3 00
William H. Spooner, Collection of Single and Semi-double Roses	2 00
Miss E. J. Clark, Display of Roses	8 00
Mrs. E. M. Gill, " " "	8 00
W. J. Clemson, Vase of Phlox Miss Lingard	1 00
Charles H. Wheeler, Pæony Norfolk	2 00
George Hollis, Display of Pæonies	2 00
T. C. Thurlow, Pæonies, etc.	4 00
T. C. Thurlow, Pæonies and Hardy Shrubs	2 00
Blue Hill Nursery, Display of Perennials	5 00
Carl Blomberg, " " "	2 00
Rea Brothers, Display of Perennials, etc.	3 00
Estate of Joseph S. Fay, Display	8 00
Estate of Joseph S. Fay, "	6 00
Dr. C. G. Weld, "	5 00
Mrs. R. M. Clark, "	2 00
Francis Blake, "	1 00
Mrs. D. Chadwick, "	1 00
I. E. Coburn, "	1 00
Jackson Dawson, "	1 00
Mrs. E. A. Wilkie, "	1 00

JUNE 30.

HARDY ROSES:—Collection, named, not less than twenty-five varieties, filling fifty vases, one rose in each vase:	
First, Estate of Joseph S. Fay	15 00
Second, Estate of Joseph S. Fay	10 00
Third, Estate of Joseph S. Fay	6 00
IRIS KÆMPFERI.—Fifteen varieties, three of each, in vases:	
First, Mrs. John L. Gardner	6 00
Six varieties, three of each:	
First, Dr. C. G. Weld	4 00
CAMPANULA MEDIUM.—Collection, not less than fifteen bottles:	
Second, Mrs. John L. Gardner	4 00
SWEET WILLIAMS.—Auricula flowered, thirty spikes of not less than six distinct varieties:	
First, Mrs. John L. Gardner	3 00
Second, W. J. Clemson	2 00
DELPHINIUMS.—Collection of twenty spikes, not less than five varieties:	
First, Mrs. John L. Gardner	5 00
Second, Miss M. S. Walker	4 00
Third, Rea Brothers	3 00

Display, thirty vases of three spikes each:

First, Mrs. John L. Gardner	6 00
Second, Rea Brothers	5 00

HARDY HERBACEOUS PLANTS.—Thirty bottles:

First, Blue Hill Nursery	6 00
Second, Rea Brothers	5 00
Third, W. J. Clemson	4 00

VASE OF FLOWERS:

First, Mrs. E. M. Gill	4 00
Second, Miss Hattie B. Winter	3 00

Gratuities:—

William H. Spooner, Crimson Rambler Roses	1 00
Estate of Joseph S. Fay, Roses	8 00
Mrs. B. P. Cheney, "	8 00
Charles W. Parker, "	1 00
Mrs. E. A. Wilkie, Roses and Sweet Williams	2 00
Mrs. E. M. Gill, Roses and General Display	4 00
W. J. Clemson, Sweet Williams	1 00
E. C. Lewis, Sweet Williams and Sweet Peas	2 00
James Comley, *Lilium longiflorum*	5 00
W. J. Clemson, General Display	3 00

JULY 7.

HOLLYHOCKS.—Double, six blooms, of six colors, in flat dishes:

Second, E. C. Lewis	2 00

Double, twelve spikes:

Second, E. C. Lewis	4 00

Single, twelve spikes:

Second, E. C Lewis	3 00

SHIRLEY POPPIES.—Display:

First, E. C. Lewis	3 00

PERENNIAL PHLOXES.—Suffruticosa or early blooming section, collection of named varieties:

First, Rea Brothers	3 00

VASE OF FLOWERS.—Best arranged:

First, Miss Hattie B. Winter	4 00
Second, Mrs. E. M. Gill	3 00

Gratuities:—

Estate of Joseph S. Fay, Display of Roses	6 00
W. J. Clemson, Japanese Irises	3 00
E. C. Lewis, Sweet Peas	1 00
Rea Brothers, Hardy Perennials	5 00
Blue Hill Nursery, " "	5 00
W. J. Clemson, Display	4 00
Mrs. J. B. Lawrence, "	1 00

JULY 14.

TUBEROUS BEGONIAS.—Collection, arranged with their own foliage, in flat dishes:

First, E. S. Converse	4 00
Second, E. S Converse	3 00
Third, H. Dumaresq	2 00

HARDY AQUATIC FLOWERS.—Collection, named:

First, Mrs. John L. Gardner	8 00

Gratuities:—

E. C. Lewis, Hollyhocks	3 00
Joseph S. Chase, "	1 00
W. J. Clemson, Vase of Allamanda	1 00
Mrs. J. B. Lawrence, Sweet Peas	2 00
W. J. Clemson, Display of Japanese Irises	2 00
M. H. Walsh, Display of Roses	2 00
Mrs. A. A. Johnson, Daisies	2 00
Blue Hill Nursery, Perennials	4 00
Rea Brothers, "	3 00
Estate of Joseph S. Fay, General Display	5 00
W. J. Clemson, Display	2 00
E. C. Lewis, "	2 00
Mrs. E. M. Gill, "	1 00

JULY 21.

SWEET PEAS.—Display of named varieties, filling thirty vases, arranged with their own foliage:

First, H. B. Watts	6 00
Second, J. Henry Fletcher	4 00
Third, Mrs. H. A. Jones	3 00

Display of named varieties in vases, six sprays in each vase:

First, H. B. Watts	4 00
Second, Mrs. H. A. Jones	3 00
Third, J. Henry Fletcher	2 00

HARDY HERBACEOUS PLANTS.—Thirty bottles:

First, Blue Hill Nursery	6 00
Second, W. J. Clemson	5 00
Third, Rea Brothers	4 00

VASE OF FLOWERS.—For table decoration:

First, Mrs. E. M. Gill	4 00
Second, Miss Hattie B. Winter	3 00

Gratuities:—

Theodore F. Dwight, Sweet Peas	1 00
Mrs. J. B. Lawrence, " "	1 00
W. J. Clemson, Allamanda and Sweet Peas	1 00
Mrs. J. B. Lawrence, Nasturtiums	1 00

E. C. Lewis, Hollyhocks	1 00
Mrs. E. A. Wilkie, Display	2 00
E. C. Lewis, "	1 00

JULY 28.

PERENNIAL PHLOXES.—Twelve named varieties, one truss of each:

First, Rea Brothers	3 00
Second, W. J. Clemson	2 00

Gratuities:—

W. J. Clemson, Vase of Tritomas	1 00
Blue Hill Nursery, Perennials	4 00
Mrs. J. B. Lawrence, Display	2 00
W. J. Clemson, "	2 00
Mrs. E. M. Gill, "	2 00
Mrs. G. Duncan, "	1 00

AUGUST 4.

ANNUALS.—General display, named, not less than fifty varieties, filling not less than one hundred and fifty bottles:

First, Mrs. John L. Gardner	10 00
Second, Mrs. E. M. Gill	8 00
Third, E. C. Lewis	6 00

Gratuities:—

Rea Brothers, Collection of Phloxes	3 00
W. J. Clemson, Phloxes and Sweet Peas	2 00
Blue Hill Nursery, Vase of *Lilium Batemanniæ*	1 00
W. J. Clemson, *Lilium auratum*, Tritoma, and Allamanda	3 00
Mrs. C. A. Jones, Collection of Annuals	3 00
Blue Hill Nursery, Herbaceous Plants	2 00
E. A. Weeks, Display	2 00

AUGUST 11.

PERENNIAL PHLOXES.—Eighteen vases of eighteen named varieties:

First, George Hollis	5 00
Second, T. C. Thurlow	4 00
Third, Rea Brothers	3 00

Gratuities:—

H. A. Wheeler, Orchids	2 00
J. Warren Clark, Gladioli	2 00
E. J Shaylor, "	1 00
Norris F. Comley, Asters	2 00
F. O. Willard, "	1 00

Rea Brothers, Delphiniums	1 00
Blue Hill Nursery, Display of Herbaceous Plants	2 00
W. J. Clemson, Display	1 00
Mrs. G. Duncan, "	1 00
Mrs. E. M. Gill, "	1 00
E. C. Lewis, "	1 00
R. P. Struthers, "	1 00

EXHIBITION OF AQUATIC PLANTS, ETC.

AUGUST 19.

Theodore Lyman Fund.

AQUATICS.—General display of Nymphæas, Nelumbiums, Sedges, Papyrus and other acquatic plants, arranged for effect, to include not less than twenty-five blooms of Nymphæas:	
First, Oakes Ames	20 00
GLADIOLI.—Twenty named varieties, in spikes:	
First, J. Warren Clark	4 00
Second, E. J. Shaylor	3 00
Ten named varieties:	
First, J. Warren Clark	3 00
Second, E. J. Shaylor	2 00
Third, Mrs. John L. Gardner	1 00
Six named varieties:	
First, J. Warren Clark	2 00
Second, Paul R. Blackmer	1 00
Display of named and unnamed varieties, filling one hundred vases, arranged for effect, with any foliage:	
First, J. Warren Clark	8 00
Second, E. J. Shaylor	6 00
ASTERS.—Large Flowered, of all classes, fifty vases, not less than twelve varieties, three flowers in each vase:	
First, Mrs. John L. Gardner	6 00
Second, Norris F. Comley	5 00
Truffaut's Pæony Flowered, thirty blooms not less than twelve varieties:	
Second, E. S Converse	3 00
Victoria Flowered, thirty blooms, not less than twelve varieties:	
First, Mrs John L. Gardner	4 00
Second, Mrs. John L. Gardner	3 00
Third, Norris F. Comley	2 00
HARDY HERBACEOUS PLANTS.—Thirty bottles:	
First, Blue Hill Nursery	6 00
Third, Blue Hill Nursery	4 00

Gratuities:—

John Lewis Childs, Floral Park, N. Y., Gladioli	4 00
Norris F. Comley, Asters	1 00
George Hollis, Display of Phloxes	3 00
W. C. Winter, Dahlias	2 00
Rea Brothers, Display	5 00
Mrs. E. M. Gill, "	3 00
James Comley, "	1 00
Mrs. E. A. Wilkie, Exhibit	2 00

AUGUST 25.

Gratuities:—

Lothrop & Higgins, Dahlias	5 00
Charles S. Pratt, "	2 00
J. Warren Clark, Gladioli	3 00
William A. Green, Asters	1 00

SEPTEMBER 1.

Gratuities:—

Lothrop & Higgins, Dahlias	5 00
C. S. Pratt, "	4 00
Mrs. J. B. Lawrence, "	3 00
Mrs. E. M. Gill, Display	2 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

SEPTEMBER 5 AND 6.

DAHLIAS.—Show, eighteen blooms, named varieties:	
First, William C. Winter	4 00
Second, Lothrop & Higgins	3 00
Fancy, eighteen blooms, named varieties:	
First, H. F. Burt	4 00
Second, Lothrop & Higgins	3 00
Cactus, twelve blooms, named varieties:	
First, H. F. Burt	4 00
Second, H. F. Burt	3 00
Third, William G. Winsor	2 00
Decorative, twelve blooms, named varieties:	
First, William G. Winsor	4 00
Second, H. F. Burt	3 00
Third, Lothrop & Higgins	2 00
Show, six blooms, named varieties:	
First, H F. Burt	2 00
Second, William G. Winsor	1 00
Fancy, six varieties:	
First, H. F. Burt	2 00
Second, H. F. Burt	1 00

Best single bloom, of any class, introduction of 1898 or later:	
First, H. F. Burt	1 00
Pompon, twelve vases of three blooms each, named varieties:	
First, William C. Winter	3 00
Second, William H. Symonds	2 00
Third, Lothrop & Higgins	1 00
Single, twelve vases of three blooms each, named varieties:	
First, William C. Winter	2 00
General Display, all classes admissible, one hundred or more bottles:	
First, William C. Winter	12 00
Second, Lothrop & Higgins	10 00
Third, C. S. Pratt	8 00
Fourth, Mrs. J. B. Lawrence	6 00
Fifth, William H. Symonds	4 00
TROPÆOLUMS. — Display with their own foliage, filling twenty-five vases, not over eighteen blooms of one variety in each:	
First, J. A. Cain	3 00
Second, E. C. Lewis	2 00
MARIGOLDS. — Display of French and African, filling twenty-five vases:	
First, E. C. Lewis	3 00
Second, Mrs. A. F. Pero	2 00
DOUBLE ZINNIAS. — Fifty flowers, not less than twelve varieties:	
Second, E. C. Lewis	2 00
Third, Norris F. Comley	1 00
POMPON ZINNIAS. — Fifty flowers, not less than twelve varieties:	
First, A. B. Howard	3 00
Third, W. A. Jeffries	1 00
DIANTHUSES. — Collection of Annual and Biennial varieties, filling thirty bottles:	
First, Mrs. J. B. Lawrence	3 00
Second, E. C. Lewis	2 00
VASE OF FLOWERS. — For table decoration, on the last day of the exhibition:	
First, Miss Hattie B. Winter	4 00
Second, Mrs. E. M. Gill	3 00
Gratuities: —	
Blue Hill Nursery, *Lilium speciosum*	2 00
James Comley, Display of Asters	5 00
Rea Brothers, Phlox	3 00
J. Warren Clark, Gladioli	3 00
A. B. Howard & Son, Petunias and Verbenas	2 00
Blue Hill Nursery, Display	6 00
W. J. Clemson, "	2 00
Mrs. E. M. Gill, "	2 00
Schlegel & Fottler, "	2 00

SEPTEMBER 8.

Gratuity:—

C. S. Pratt, Dahlias	2 00

SEPTEMBER 15.

DAHLIAS.—Cactus, twelve blooms, named varieties:	
First, H. F. Burt	3 00
Second, H. F. Burt	2 00
Third, W. G. Winsor	1 00
PERENNIAL ASTERS.—Collection of Native or Introduced species and varieties:	
First, Misses Eleanor A. and Mollie S. Doran	5 00
Second, Blue Hill Nursery	4 00
Third, Miss Alice L. Grinnell	3 00
HARDY HERBACEOUS PLANTS.—Thirty bottles:	
First, Blue Hill Nursery	6 00
Second, Carl Blomberg	5 00
Third, W. J. Clemson	4 00

Gratuities:—

William G. Winsor, Dahlias	2 00
William C. Winter, "	2 00
H. F. Burt, "	2 00
James Comley, Asters	1 00
Rea Brothers, Phlox	2 00
Rea Brothers, *Delphinium formosum*	1 00
W. J. Clemson, Allamanda	1 00
Francis Skinner, Jr., Display	2 00

SEPTEMBER 22.

Gratuity:—

C. S. Pratt, Display of Dahlias	2 00

SEPTEMBER 27 AND 28.

Gratuities:—

F. A. Blake, Geraniums, named varieties	3 00
H. F. Burt, Dahlias	3 00
E. C. Lewis, Display	2 00

OCTOBER 20.

Gratuities:—

Mrs. E. M. Gill, Chrysanthemums	1 00
James Comley, "	1 00

OCTOBER 27.

Gratuity:—

Mrs. E. M. Gill, Display	1 00

CHRYSANTHEMUM SHOW.

NOVEMBER 6, 7, 8, AND 9.

Josiah Bradlee Fund.

CHRYSANTHEMUMS.—Twenty-five blooms of twenty-five distinct varieties, named:

First, Mrs. B. P. Cheney	18 00
Second, Miss E. J. Clark, Pomfret, Conn.	12 00
Third, Col. Charles Pfaff	8 00
Six vases of six named varieties, ten blooms each:	
First, Mrs. A. W. Spencer	30 00
Second, Mrs. B. P. Cheney	25 00
Third, Norris F. Comley	20 00

Henry A. Gane Memorial Fund.

For the best twelve specimen blooms of any of the Seedling Chrysanthemums, originated by the late Henry A. Gane:

First, Charles D. Sias	20 00
Second, Mrs. A. W. Spencer	10 00

Society's Prizes.

Twelve blooms, Incurved, named, in vases:	
Second, Dr. C. G. Weld	6 00
Third, E. S. Converse	4 00
Twelve blooms, Japanese, named, in vases:	
First, Mrs. B. P. Cheney	10 00
Twelve blooms, Japanese Incurved, named:	
First, Mrs. B. P. Cheney	10 00
Second, Joseph H. White	6 00
Third, Col. Charles Pfaff	4 00
Twelve blooms, Anemone, named:	
First, Dr. C. G. Weld	8 00
Third, E. S. Converse	4 00
Six blooms, Incurved, named:	
First, E. S. Converse	5 00
Second, Dr. C. G. Weld	4 00
Six blooms, Japanese, named:	
First, Joseph H. White	6 00
Six blooms, Japanese Incurved, named:	
First, H. Dumaresq	6 00
Second, Mrs. G. W. Knowlton	4 00
Third, Col. Charles Pfaff	2 00
Six blooms Reflexed, named, in vases:	
First, Joseph H. White	6 00
Second, Mrs. B. P. Cheney	4 00
Third, Col. Charles Pfaff	2 00

Six blooms, Anemone, named, in vases:
First, E. S. Converse 5 00
Second, W. A. Jeffries 4 00
Best six varieties, named, introductions of the current year:
First, H. Dumaresq 6 00
Vase of ten blooms on long stems, Pink, named:
First, Robert Laurie, Newport, R. I. 10 00
Second, Mrs. B. P. Cheney 8 00
Third, Mrs. A. W. Spencer 6 00
Vase of ten blooms on long stems, Red, named:
First, Miss E. J. Clark 10 00
Second, Mrs. A. W. Spencer 8 00
Third, Charles D. Sias 6 00
Vase of ten blooms on long stems, White, named:
First, Mrs. A. W. Spencer 10 00
Second, Robert Laurie 8 00
Third, Miss E. J. Clark 6 00
Vase of ten blooms on long stems, Yellow, named:
First, Mrs. A. W. Spencer 10 00
Second, Robert Laurie 8 00
Third, Col. Charles Pfaff 6 00
Vase of ten blooms, on long stems, any other color, named:
First, Miss E. J. Clark 10 00
Second, Mrs. B. P. Cheney 8 00
Third, Mrs. A. W. Spencer 6 00
Vase of blooms on long stems, arranged in the Society's large China vases; prizes to be repeated every day during the exhibition:
First, Estate of John Simpkins 10 00
Second, Col. Charles Pfaff 9 00
Third, Mrs. A. W. Spencer 8 00
Fourth, Miss E. J. Clark 7 00
Best Seedling, Red, never disseminated, six blooms:
John N. May, for Brutus 5 00
Best Seedling, White, never disseminated, six blooms:
J. W. Frasier, for Dr. J. A. Frasier 5 00
Best Seedling, any other color, never disseminated, six blooms:
John N. May, for Yanariva 5 00

Gratuities:—

Miss E. J. Clark, Vase of Chrysanthemum Mrs. Bown . . . 6 00
H. H. Rogers, Chrysanthemums 3 00
John Thomas, " 3 00
E. S. Converse, " 2 00
J. W. Howard, Vases of Roses 1 00
Dailledouze Brothers, Flatbush, N. Y., Carnation Prosperity . 1 00
M. A. Patten, Carnations 10 00

Albert Roper, Display of Carnations	5 00
I. E. Coburn, Pansies	2 00
Blue Hill Nursery, Hardy Flowers	2 00
Mrs. E. M. Gill, Display	3 00
James Comley, "	1 00

AWARDS OF NOVEMBER 7.

CHRYSANTHEMUMS.—Vase of blooms, on long stems, arranged in the Society's large China vases:

First, Col. Charles Pfaff	10 00
Second, Mrs. A. W. Spencer	9 00
Third, Miss E. J. Clark	8 00
Fourth, Estate of John Simpkins	7 00

ROSES.—Vase of twenty-five blooms, assorted varieties:

First, J. W. Howard	5 00

Gratuities:—

Mrs. A. W. Spencer, Vase of Chrysanthemum Major Bonnafon	3 00
William Sim, Vase of Violets	1 00
James Comley, Vase of Chrysanthemums	5 00
Norris F. Comley, " " "	5 00

AWARDS of NOVEMBER 8.

CHRYSANTHEMUMS.—Vase of blooms, on long stems, arranged in the Society's large China vases:

First, Col. Charles Pfaff	10 00
Second, Miss E. J. Clark	9 00
Third, Mrs. A. W. Spencer	8 00
Fourth, Estate of John Simpkins	7 00

VIOLETS.—Single, collection of varieties, fifty blooms each:

First, Norris F. Comley	5 00
Second, William Sim	4 00

Double, collection of varieties, fifty blooms each:

First, Mrs. A .W. Spencer	5 00
Second, Norris F. Comley	4 00

AWARDS OF NOVEMBER 9.

CHRYSANTHEMUMS.—Vase of blooms, on long stems, arranged in the Society's large China vases:

First, Col. Charles Pfaff	10 00
Second, Estate of John Simpkins	9 00
Third, Miss E. J. Clark	8 00
Fourth, Mrs. A. W. Spencer	7 00

SOCIETY'S SILVER MEDALS.

April 5. David Monteith, for Carnation Beulah.

May 5. The Floral Exchange, Inc., Philadelphia, Pa., for New Rose Queen of Edgely.

Rose Exhibition, June 22 and 23. Jackson Dawson, for Rose Lady Duncan.

July 7. Michael H. Walsh, for Rose Sweetheart, *Rosa Wichuraiana* × Bridesmaid.

Chrysanthemum Show, November 6–9. Col. Charles Pfaff for largest number of first prizes for Vase of Chrysanthemums.

SOCIETY'S BRONZE MEDALS.

Chrysanthemum Show, November 6-9. Robert Montgomery, for Rose Mrs. Oliver Ames.

" " " " Estate of John Simpkins, for largest number of second prizes for Vase of Chrysanthemums.

KELWAY SILVER GILT MEDAL.

June 16. Kenneth Finlayson, for *Pæonia albiflora*.

FIRST CLASS CERTIFICATES OF MERIT.

March 10. C. W. Ward, Queens, N. Y., for Carnation G. H. Crane.

" " C. W. Ward, for Carnation Governor Roosevelt.

March 31. Hicks Arnold, for *Lælia Jongheana*.

April 7. Thomas J. Grey & Co., for Grey's Mammoth White Column Stock.

May 19. William Sim, for Candytuft Sim's Improved.

" 26. R. & J. Farquhar & Co., for *Begonia semperflorens*, new named varieties.

Rhododendron Exhibition, June 12 and 13. H. H. Hunnewell, *Viburnum macrocephalum*.

Rose Exhibition, June 22 and 23. Rea Brothers, for *Campanula persicæfolia grandiflora*.

" " " " " " W. A. Manda, South Orange, N. J., for Rose Pink Pearl.

July 14. Dr. C. G. Weld, for *Gerbera Jamesonii*.

" 21. Oakes Ames, for Nymphæa × Diana.

August 4. Henry T. Clinkaberry, Trenton, N. J., for *Cypripedium Clinkaberryanum*, *C. Curtisii* × *C. Philippinensis*.

HONORABLE MENTION.

February 24. David Monteith, for Carnation Beulah.

March 10. Dailledouze Brothers, Flatbush, N. Y., for Carnation No. 666.

" 31. Alfred J. Lovelace, for Antirrhinum Wyndhurst.

" " Hicks Arnold, for *Dendrobium atro-violaceum*.

May 5. D. Carmichael, for Carnation Eleanor Ames.

" 19. Dr. C. G. Weld, for *Morphixia longiflora*.

Rose Exhibition, June 22 and 23. W. A. Manda, for Rose Improved Pink Roamer, Jersey Beauty × Bardou Job.

August 11. Hon. Charles W. Hoitt, Nashua, N. H., for *Lilium Henryi*.

" 18. J. Lewis Childs, Floral Park, N. Y., for *Tritoma Pfitzeri*.

REPORT

OF THE

COMMITTEE ON FRUITS

FOR THE YEAR 1900.

By E. W. WOOD, CHAIRMAN.

The past season has shown the usual variation in the production of the different kinds of fruit grown in the state. In all localities the set of apples was unusually full. The excess in quantity of fruit and the drought during the summer retarded their growth, but the gale in September reduced the quantity of most varieties, in many places at least one half. The Baldwins were less reduced than most other varieties. This process of thinning the fruit was unevenly distributed over the trees, being mostly from the windward side, but it relieved the overburdened trees, and the fruit remaining attained larger size and better quality. The unusual crop and the difficulty of furnishing barrels induced some growers to accept first offers and they sold at low rates, delivered loose in the cars, but the large amount recently exported and the demand from western markets have prevented any surplus and at the present time well packed fruit is bringing satisfactory prices.

Pears shown at the exhibitions have not been equal to the average of past years in size or quantity. About the usual quantity of the earlier varieties were shown but the gale blew many of the best specimens of the later varieties from the trees. The Anjou pear seems to be losing its former high reputation as a commercial fruit. While with some growers it apparently sustains its

former standard, in many places the past few years and especially the past season it has been so badly spotted as to be almost worthless.

Peaches have been shown in larger quantities than usual. The Elberta was shown by several growers. It is of large size, good quality, and exceptionally good color. This variety is largely grown in the Southern States; if it proves as hardy here as other varieties it will be a valuable acquisition.

Plums continue to increase in quantity and in the number of varieties, the increase being due to the more general cultivation of the Japanese varieties. Of these recent additions most of those shown were of good size and quality.

Cherries have been almost a complete failure; there was an unusually full bloom, but a freeze killed the fruit germs and only in exceptionally favorable locations was there any fruit.

Grapes have been shown in more than the usual quantity and of excellent quality; the warm, dry weather late in the season was favorable for their full maturity.

The exhibition of small fruits has been fully up to the average of past years.

The exhibitions through the season compared favorably with those of previous years. At the Strawberry Exhibition the Marshall sustained its former reputation as an exhibition variety, and where grown on a strong soil under high cultivation and the vines properly thinned, it proved a profitable market variety. At the Saturday exhibition the following week there were shown two seedling varieties that are very promising for late kinds. With the exception of these two seedling strawberries there were no new fruits shown deserving special mention.

The appropriation for Fruits was seventeen hundred and thirty-two dollars; there have been awarded in prizes and gratuities fifteen hundred and eighty-nine dollars, leaving an unexpended balance of one hundred and forty-three dollars.

For the Committee,

E. W. WOOD, *Chairman.*

PRIZES AND GRATUITIES AWARDED FOR FRUITS.

1900.

SPRING EXHIBITION.

MARCH 20, 21, 22, AND 23.

WINTER APPLES. — Baldwin:	
First, C. F. Boyden	3 00
Second, A. E. Hartshorn	2 00
Third, E. M. Bruce	1 00
Northern Spy:	
First, C. F. Boyden	3 00
Roxbury Russet:	
First, Miss E. J. Cutter	3 00
Second, C. F. Boyden	2 00
Third, A. E. Hartshorn	1 00
Tompkins King:	
First, George C. Rice	3 00
Any other variety:	
First, A. E. Hartshorn, Sutton	3 00
Second, George V. Fletcher, Rhode Island Greening	2 00
Third, Mrs. A. E. Underwood, " " "	1 00
WINTER PEARS. — Any variety:	
First, George V. Fletcher, Anjou	3 00
Second, George V. Fletcher, Dana's Hovey	2 00
STRAWBERRIES. — One pint:	
First, Francis Blake, Marshall	3 00
Gratuity: —	
John L. Bird, Oranges	1 00

APRIL 7.

Gratuity: —	
William C. Winter, Peaches	1 00

JUNE 16.

Gratuity: —	
William C. Winter, Grapes and Peaches	2 00

ROSE AND STRAWBERRY EXHIBITION.

JUNE 22 AND 23.

Special Prizes from the Theodore Lyman Fund.

STRAWBERRIES.—Four quarts of any variety:

First, Warren Heustis & Son, Marshall	20 00
Second, Sumner Coolidge, "	16 00
Third, Warren Heustis & Son, Bubach	12 00
Fourth, George V. Fletcher, Marshall	10 00

Special Prizes offered by the Society.

Two quarts of any variety best adapted for garden cultivation for home use to be judged by points:

First, I. E. Coburn, Marshall	6 00
Second, Warren Heustis & Son, Marshall	5 00
Third, Warren Heustis & Son, Nick Ohmer	4 00
Fourth, George McWilliam, Seedling	3 00

Regular Prizes.

For the largest and best collection, not less than fifteen baskets of two quarts each, and not less than five varieties:

Second, George F. Wheeler	15 00
Ten baskets, two quarts each, not less than three varieties:	
First, Warren Heustis & Son	15 00
Second, George V. Fletcher	12 00
Third, George F. Wheeler	10 00
Five baskets, one variety, two quarts each:	
First, Warren Heustis & Son	8 00
Second, George F. Wheeler, Sample	6 00
Third, George F. Wheeler, Seedling	5 00
Two quarts of Belmont:	
First, Warren Heustis & Son	4 00
Second, George V. Fletcher	3 00
Brandywine:	
Third, George F. Wheeler	2 00
Bubach:	
First, George V. Fletcher	4 00
Second, I. E. Coburn	3 00
Third, Warren Heustis & Son	2 00
Charles Downing:	
Second, Miss M. S. Walker	3 00
Clyde:	
First, I. E. Coburn	4 00
Third, George F. Wheeler	2 00
Crescent:	
Second, I. E. Coburn	3 00

Enormous:
First, George V. Fletcher 4 00
Haverland:
First, I. E. Coburn 4 00
Second, George F. Wheeler 3 00
Third, Miss E. J. Clark 2 00
Jessie:
First, George V. Fletcher 4 00
Margaret:
First, B. M. Smith 4 00
Second, George F. Wheeler 3 00
Marshall:
First, Warren Heustis & Son 4 00
Second, Herbert Dumaresq 3 00
Third, George V. Fletcher 2 00
Miner's Prolific:
Second, George F. Wheeler 3 00
Any other variety:
First, I. E. Coburn, Sample 4 00
Second, I. E. Coburn, Nick Ohmer 3 00
Third, George F. Wheeler, Sample 2 00
Collection, not less than six varieties, one quart of each:
First, George V. Fletcher 8 00
Second, George F. Wheeler 6 00
One quart of any new variety not previously exhibited:
First, S. H. Warren, Seedling 5 00
FOREIGN GRAPES.—Two bunches of any variety:
First, Miss E. J. Clark, Pomfret, Conn., Black Hamburg . 6 00
Second, E. S. Converse, White Sweetwater 4 00
FORCED PEACHES.—Six specimens of any variety:
First, Miss E. J. Clark, Hale's Early 3 00
Second, Miss M. S. Walker, " " 2 00

JUNE 30.

STRAWBERRIES.—Two quarts of any variety:
First, Warren Heustis & Son, Marshall 4 00
Second, William H. Monroe, Seedling 3 00
Third, George V. Fletcher, Marshall 2 00
CHERRIES.—Two quarts of Black Tartarian:
First, James L. Duncan 3 00
Second, George V. Fletcher 2 00
Coe's Transparent:
First, John L. Bird 3 00
Downer:
First, M. W. Chadbourne 3 00
Any other variety:
First, J. H. Fletcher, Napoleon 3 00
Second, Miss Vera Chapelle, Napoleon 2 00

Gratuity:—

E. O. Orpet, Nectarines 2 00

JULY 7.

CURRANTS.—Two quarts of any Red variety:

First, W. J. Clemson, Versaillaise 4 00
Second, W. J. Clemson, Fay's 3 00
Third, W. J. Clemson 2 00
Fourth, William C. Winter, Fay's 1 00

Two quarts of any White variety:

First, W. J. Clemson, White Grape 3 00
Second, Joseph S. Chase, " " 2 00
Third, William C. Winter, " " 1 00

GOOSEBERRIES.—Two quarts of any variety of American origin:

First, J. S. Chase, Triumph 4 00
Second, W. J. Clemson, Columbia 3 00
Third, G. L. Brown, Triumph 2 00
Fourth, W. J. Clemson, " 1 00

Gratuities:—

W. H. Monroe, Seedling Strawberries 2 00
Warren Heustis & Son, Marshall Strawberries 1 00
Miss Vera Chapelle, Cherries 1 00
M. W. Chadbourne, Cherries and Currants 1 00

JULY 14.

RASPBERRIES.—Two quarts of any variety:

First, E. S. Converse, Columbia 3 00

CURRANTS.—One quart of any Red variety:

First, W. J. Clemson, Versaillaise 3 00
Second, W. J. Clemson, Fay's 2 00
Third, Mrs. E. M. Gill, Versaillaise 1 00

One quart of any White variety:

First, W. A. Jeffries, White Grape 2 00
Second, W. J. Clemson, " " 1 00

GOOSEBERRIES.—Two quarts of any Foreign variety:

First, W. J. Clemson, Whitesmith 4 00
Second, W. J. Clemson, Industry 3 00
Third, Dr. W. G. Kendall, " 2 00
Fourth, William O'Connell, " 1 00

Gratuities:—

E. O. Orpet, Nectarines 1 00
W. J. Clemson, Collection 2 00

JULY 21.

BLACKBERRIES.—Two quarts of any variety:

First, M. W. Chadbourne 3 00

APPLES. — Tetofsky:

First, Varnum Frost	3 00
Second, William C. Winter	2 00
Third, David L. Fiske	1 00

PEARS. — Summer Doyenne:

First, E. S. Converse	3 00
Second, Warren Fenno	2 00
Third, L. M. Chase	1 00

PEACHES. — Six of any variety:

First, William C. Winter, Early Crawford	3 00

Gratuities:—

Mrs. E. M. Gill, Currants	1 00
W. J. Clemson, Collection	1 00

JULY 28.

APPLES. — Red Astrachan:

First, W. H. Hunt	3 00
Second, F. W. Damon	2 00
Third, John L. Bird	1 00

Sweet Bough:

First, Sumner Coolidge	3 00
Second, George V. Fletcher	2 00
Third, Warren Heustis & Son	1 00

Any other variety:

First, David L. Fiske, Early Harvest	3 00
Second, Sumner Coolidge, Oldenburg	2 00
Third, G. L. Brown, Yellow Transparent	1 00

PEARS. — Giffard:

First, A. T. Brown	3 00
Second, Warren Fenno	2 00
Third, John L. Bird	1 00

Any other variety:

First, Sumner Coolidge, Clapp's Favorite	3 00
Second, John L. Bird, Wilder	2 00
Third, Warren Fenno, Summer Doyenne	1 00

BLACKBERRIES. — Two quarts of any variety:

First, E. W. Wood	3 00
Second, E. C. Lewis	2 00
Third, Francis Blake	1 00

PEACHES. — Open culture, any variety:

First, George H. Sherwin, Hale's Early	3 00
Second, W. D. Hinds, Blush	2 00
Third, Francis Blake, Hale's Early	1 00

AUGUST 4.

APPLES. — Oldenburg:

First, Arthur F. Estabrook	3 00

Second, Mrs. H. A. Clark	2 00
Third, W. H. Hunt	1 00
Any other variety:	
First, Sumner Coolidge	3 00
Second, A. E. Mayell	2 00
Third, W. H. Hunt	1 00
PEARS.—Clapp's Favorite:	
First, Sumner Coolidge	3 00
Second, George V. Fletcher	2 00
Third, A. T. Brown	1 00
Any other variety:	
First, A. T. Brown, Giffard	2 00
Second, Warren Fenno, "	1 00
PEACHES.—Out door culture:	
First, George H. Sherwin, Hale's Early	3 00
Second, W. J. Clemson, Alexander	2 00
Third, W. D. Hinds, "	1 00
Six specimens of cold house or pot culture:	
First, William C. Winter, Late Crawford	3 00
BLACKBERRIES.—Two quarts of any variety:	
First, Sumner Coolidge	3 00
Second, Nathaniel T. Kidder	2 00
Third, E. W. Wood	1 00
PLUMS.—Japanese, any variety:	
First, W. D. Hinds, Red June	3 00
Second, W. J. Clemson, Kelsey	2 00
FOREIGN GRAPES.—Two bunches of any variety:	
First, Miss E. J. Clark, Pomfret, Conn., Black Hamburg	5 00
Second, Miss E. J. Clark, Madresfield Court	4 00
Gratuities:—	
M. W. Chadbourne, Collection	1 00
W. J. Clemson, "	1 00

AUGUST 11.

APPLES.—Chenango:	
First, Sumner Coolidge	3 00
Second, Charles F. Curtis	2 00
Summer Pippin:	
First, O. B. Hadwen	3 00
Second, Warren Fenno	2 00
Williams:	
First, Sumner Coolidge	3 00
Second, Varnum Frost	2 00
Third, Joshua C. Stone	1 00
Any other variety:	
First, W. H. Hunt, Red Astrachan	3 00

Second, George V. Fletcher, Sweet Bough	2 00
Third, David L. Fiske, Oldenburg	1 00
PEARS.—Rostiezer:	
First, E. S. Converse	3 00
Second, M. W. Chadbourne	2 00
Third, Sumner Coolidge	1 00
Tyson:	
First, John L. Bird	3 00
Second, A. T. Brown	2 00
Third, L. M. Chase	1 00
Any other variety:	
First, Sumner Coolidge, Clapp's Favorite	3 00
Second, James L. Duncan, " "	2 00
Third, A. T. Brown, " "	1 00
PEACHES.—Any variety:	
First, W. D. Hinds, Alexander	3 00
Second, George H. Sherwin, Alexander	2 00
Third, Sumner Coolidge, Hale's Early	1 00
PLUMS, JAPANESE.—Abundance:	
First, E. C. Lewis	3 00
Second, W. D. Hinds	2 00
Third, David L. Fiske	1 00
Burbank:	
First, Sumner Coolidge	3 00
Second, David L. Fiske	2 00
Third, W. D. Hinds	1 00
Any other variety:	
First, E. C. Lewis, Moore's Arctic	3 00
Second, W. J. Clemson, " "	2 00
Third, W. D. Hinds, Red June	1 00
Gratuity:—	
E. J. Beswind, Italian Grapes	1 00

AUGUST 18.

APPLES.—Foundling:	
First, O. B. Hadwen	3 00
Second, C. M. Handley	2 00
Gravenstein:	
First, Warren Heustis & Son	3 00
Second, J. C. Stone	2 00
Third, W. H. Hunt	1 00
Maiden's Blush:	
First, William C. Winter	3 00
Second, J. C. Stone	2 00
Third, Warren Fenno	1 00

Porter:

First, Sumner Coolidge	3 00
Second, C. M. Handley	2 00
Third, M. W. Chadbourne	1 00

Any other variety:

First, J. C. Stone, Williams	3 00
Second, O. B. Hadwen, Somerset	2 00
Third, Varnum Frost, Williams	1 00

PEARS.—Andrews:

First, E. S. Converse	3 00
Third, J. C. Stone	1 00

Bartlett:

First, William Milman	3 00
Second, A. T. Brown	2 00
Third, Sumner Coolidge	1 00

Any other variety:

First, Sumner Coolidge, Clapp's Favorite	3 00
Second, A. T. Brown, " "	2 00
Third, Warren Fenno " "	1 00

PEACHES.—Collection:

First, Sumner Coolidge	4 00
Second, W. D. Hinds	3 00

Single dish of any variety:

First, Sumner Coolidge, Early Rivers	3 00
Second, Sumner Coolidge, Alexander	2 00
Third, W. D. Hinds, Early Rivers	1 00

PLUMS.—Bradshaw:

First, Francis Blake	3 00
Second, M. W. Chadbourne	2 00
Third, George V. Fletcher	1 00

Any other variety:

First, E. C. Lewis, Abundance	3 00
Second, Sumner Coolidge, Burbank	2 00
Third, W. D. Hinds, Abundance	1 00

Gratuity:—

William C. Winter, Peaches	1 00

AUGUST 25.

Gratuities:—

C. O. Johnson, Apples	1 00
Hon. Aaron Low, Plums	1 00
J. S. Chase, Grapes	1 00

SEPTEMBER 1.

Gratuity:—

Hon. Aaron Low, Collection of Plums	1 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

SEPTEMBER 5 AND 6.

Special Prizes from the Theodore Lyman Fund.

FOREIGN GRAPES.—For the heaviest and best ripened bunch of any Foreign Black Grape:	
First, Miss E. J. Clark, Pomfret, Conn., Barbarossa	15 00
Second, Miss E. J. Clark, Black Alicante	10 00

Society's Prizes.

FOREIGN GRAPES.—Two bunches of Black Alicante:	
First, Miss E. J. Clark	5 00
Black Hamburg:	
Second, Daniel Brown	4 00
Golden Hamburg:	
First, Daniel Brown	5 00
Lady Downes:	
First, Miss E. J. Clark	5 00
Any other variety:	
First, Miss E. J. Clark, Gros Maroc	5 00
Second, Miss E. J. Clark, Mrs. Pearson	4 00
Third, Miss E. J. Clark, Cannon Hall Muscat	3 00
Gratuities:—	
Warren Fenno, Nectarines	1 00
J. S. Chase, Grapes and Peaches	2 00
Miss E. J. Cutter, Collection	3 00

SEPTEMBER 15.

APPLES.—Foundling:	
First, C. M. Handley	3 00
Second, O. B. Hadwen	2 00
Garden Royal:	
First, J. C. McNeil	3 00
Second, C. B. Travis	2 00
Third, C. M. Handley	1 00
Gravenstein:	
First, Sumner Coolidge	3 00
Second, David L. Fiske	2 00
Third, I. A. Boston	1 00
Maiden's Blush:	
First, O. B. Hadwen	3 00
Second, E. S. Converse	2 00
Third, H. R. Kinney	1 00
Porter:	
First, George W. Stevens	3 00
Second, Thomas L. Perkins	2 00
Third, M. W. Chadbourne	1 00

Bietigheimer:	
First, Sumner Coolidge	3 00
Pumpkin Sweet:	
First, G. W. Stevens	3 00
Second, O. B. Hadwen	2 00
Third, John Parker	1 00
Washington Strawberry:	
First, J. C. Stone	3 00
Second, Sumner Coolidge	2 00
Third, A. E. Hartshorn	1 00
Any other variety:	
First, C. M. Handley, Wealthy	3 00
Second, C. M. Handley, Fall Orange	2 00
Third, W. H. Hunt, Mackintosh	1 00
CRAB APPLES.—Transcendent, twenty-four specimens:	
First, L. J. Fosdick	2 00
Second, George W. Stevens	1 00
Any other variety:	
First, M. W. Chadbourne, Hyslop	2 00
Second, F. J. Kinney, Montreal Beauty	1 00
PEARS.—Bartlett:	
First, William Milman	3 00
Second, A. T. Brown	2 00
Third, George E. Freeman	1 00
Belle Lucrative:	
First, E. S. Converse	3 00
Second, A. T. Brown	2 00
Third, L. M. Chase	1 00
Boussock:	
First, Sumner Coolidge	3 00
Second, Charles E. Swain	2 00
Third, E. W. Wood	1 00
Hardy:	
First, E. S Converse	3 00
Second, Charles F. Curtis	2 00
Third, L. M. Chase	1 00
Paradise of Autumn:	
First, William Milman	3 00
Second, L. M. Chase	2 00
Third, Warren Fenno	1 00
Souvenir du Congrès:	
First, Sumner Coolidge	3 00
Second, Miss Ellen M. Hersey	2 00
Third, Warren Fenno	1 00
Any other variety:	
First, George E. Freeman, Sheldon	3 00
Second, A. T. Brown, Seckel	2 00
Third, Mrs. James McCormick	1 00

PEACHES.—Coolidge's Favorite:	
First, Sumner Coolidge	3 00
Second, David L. Fiske	2 00
Early Crawford:	
First, Sumner Coolidge	3 00
Second, Francis Blake	2 00
Third, Charles E. Swain	1 00
Crosby:	
First, C. F. Hayward	3 00
Second, F. J. Kinney	2 00
Third, W. D. Hinds	1 00
Foster:	
First, Sumner Coolidge	3 00
Second, David L. Fiske	2 00
Third, Charles E. Swain	1 00
Oldmixon Freestone:	
First, Francis Blake	3 00
Second, Sumner Coolidge	2 00
Third, Charles S. Smith	1 00
Stump the World:	
First, Sumner Coolidge	3 00
Second, L. M. Chase	2 00
Third, George L. Brown	1 00
Any other variety:	
First, A. T. Brown, Champion	3 00
Second, Charles E. Swain, Champion	2 00
Third, Sumner Coolidge, Elberta	1 00
NECTARINES.—Any variety of outdoor culture:	
First, Francis Blake	2 00
Second, Warren Fenno	1 00
PLUMS.—Imperial Gage:	
Third, George V. Fletcher	1 00
Lombard:	
First, I. A. Boston	3 00
Second, H. R. Kinney	2 00
Third, George A. Walker	1 00
McLaughlin:	
First, W. D. Hinds	3 00
Washington:	
First, F. J. Kinney	3 00
Any other variety:	
First, Hittinger Brothers, Pond's Seedling	3 00
Second, George V. Fletcher, Yellow Egg	2 00
Third, H. R. Kinney, Bradshaw	1 00
JAPANESE PLUMS.—Any variety:	
First, W. D. Hinds, Satsuma	3 00

NATIVE GRAPES.—Six bunches of Campbell's Early:

Second, F. J. Kinney	2 00
Third, J. S. Chase	1 00
Massasoit:	
First, Joseph S. Chase	3 00
Second, George Lincoln	2 00
Third, H. R. Kinney	1 00
Moore's Early:	
First, H. R. Kinney	3 00
Second, F. W. Damon	2 00
Third, J. S. Chase	1 00
Any other variety:	
First, J. S. Chase, Brighton	3 00
Second, F. J. Kinney, Worden	2 00
Third, F. W. Damon, Delaware	1 00
Any variety from girdled vines:	
First, F. J. Kinney, Worden	3 00
Second, H. R. Kinne,y Agawam	2 00
Third, H. R. Kinney, Delaware	1 00

SEPTEMBER 22.

Gratuity:—

J. S. Chase, Collection of grapes	2 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

SEPTEMBER 27 AND 28.

Special Prizes.

Samuel Appleton Fund.

APPLES.—Baldwin, Joshua C. Stone	5 00
Hubbardston, W. H. Boyden	5 00
PEARS.—Bosc, Sumner Coolidge	5 00
Sheldon, Sumner Coolidge	5 00

Benjamin V. French Fund.

APPLES.—Gravenstein, E. M. Bruce	5 00
Rhode Island Greening, Sumner Coolidge	5 00

Marshall P. Wilder Fund.

PEARS.—Anjou:	
First, William Milman	4 00
Second, A. T. Brown	3 00
Third, Charles Whittier	2 00
Fourth, F. W. Damon	1 00

Bartlett:	
First, Varnum Frost	4 00
Second, William Milman	3 00
Third, A. T. Brown	2 00
Fourth, Sumner Coolidge	1 00
GRAPES.—Concord, twelve bunches:	
First, Ernest Lincoln	4 00
Second, F. W. Damon	3 00
Third, H. R. Kinney	2 00
Fourth, J. S. Chase	1 00
Worden, twelve bunches:	
First, F. J. Kinney	4 00
Second, H. R. Kinney	3 00
Third, J. S. Chase	2 00

Theodore Lyman Fund.

APPLES.—Baldwin:	
First, Sumner Coolidge	4 00
Second, Paul W. Costain	3 00
Third, Charles O. Johnson	2 00
Dutch Codlin:	
Second, Warren Fenno	2 00
Third, J. C. Stone	1 00
Fall Orange:	
First, C. M. Handley	3 00
Second, O. B. Hadwen	2 00
Third, C. T. Foster	1 00
Fameuse:	
First, Sumner Coolidge	3 00
Second, E. M. Bruce	2 00
Third, George V. Fletcher	1 00
Fletcher Russet:	
First, Charles F. Curtis	3 00
Second, George V. Fletcher	2 00
Third, W. E. Teele	1 00
Foundling:	
First, E. M. Bruce	4 00
Second, C. M. Handley	3 00
Gloria Mundi:	
First, E. M. Bruce	3 00
Golden Russet:	
First, H. R. Kinney	2 00
Second, E. M. Bruce	1 00
Gravenstein:	
First, Samuel Howe	4 00
Second, H. R. Kinney	3 00
Third, A. E. Hartshorn	2 00

Hubbardston:	
First, E. M. Bruce	4 00
Second, C. M. Handley	3 00
Third, M. W. Chadbourne	2 00
Hunt Russet:	
First, W. H. Boyden	3 00
Second, W. H. Hunt	2 00
Third, George F. Wheeler	1 00
Jacobs Sweet:	
First, M. Martin	3 00
Second, Charles F. Curtis	2 00
Lady's Sweet:	
First, David L. Fiske	2 00
Second, William C. Winter	1 00
Mackintosh:	
First, F. J. Kinney	4 00
Second, George C. Rice	3 00
Third, Mrs. F. A. Hale	2 00
Maiden's Blush:	
First, E. S. Converse	2 00
Second, O. B. Hadwen	1 00
Mother:	
First, George C. Rice	3 00
Second, H. R. Kinney	2 00
Third, George L. Brown	1 00
Northern Spy:	
First, George V. Fletcher	3 00
Second, A. E. Hartshorn	2 00
Third, E. M. Bruce	1 00
Porter:	
First, Sumner Coolidge	3 00
Second, M. W. Chadbourne	2 00
Third, C. M. Walker	1 00
Pound Sweet:	
First, George C. Rice	3 00
Second, Charles O. Johnson	2 00
Third, George V. Fletcher	1 00
Rhode Island Greening:	
First, E. M. Bruce	4 00
Second, A. E. Hartshorn	3 00
Third, W. H. Boyden	2 00
Roxbury Russet:	
First, Sumner Coolidge	4 00
Second, J. C. Stone	3 00
Third, F. O. Barrett	2 00
Sutton:	
First, F. J. Kinney	3 00

Second, A. E. Hartshorn	2 00
Third, David L. Fiske	1 00
Tolman Sweet:	
First, David L. Fiske	3 00
Second, George C. Rice	2 00
Third, W. H. Boyden	1 00
Tompkins King:	
First, E. J. Picanco	3 00
Second, George C. Rice	2 00
Third, Sumner Coolidge	1 00
Palmer:	
First, David L. Fiske	3 00
Second, E. M. Bruce	2 00
Third, O. B. Hadwen	1 00
Wealthy:	
First, J. S. Hodge	3 00
Second, W. D. Hinds	2 00
Third, E. U. Powers	1 00
Any other variety:	
First, Sumner Coolidge, Washington Strawberry	3 00
Second, George C. Rice, Twenty Ounce	2 00
Third, Warren Fenno, Alexander	1 00
CRAB APPLES.—Hyslop, twenty-four specimens:	
First, M. W. Chadbourne	2 00
Second, F. J. Kinney	1 00
Any other variety:	
First, F. J. Kinney, Montreal Beauty	2 00

Special Prizes offered by the Society.

PEARS.—Seckel, E. E. Doran	5 00
PEACHES.—Any variety, Sumner Coolidge, Elberta	5 00
NATIVE GRAPES.—Twelve bunches, any variety, J. S. Chase, Brighton	5 00

Regular Prizes.

PEARS.—Angouleme:	
First, A. T. Brown	4 00
Second, F. W. Damon	3 00
Third, Sumner Coolidge	2 00
Fourth, Edwin A. Hall	1 00
Bosc:	
First, A. T. Brown	4 00
Second, James M. Teele	3 00
Third, M. W. Chadbourne	2 00
Fourth, Sumner Coolidge	1 00

Clairgeau:	
First, Sumner Coolidge	3 00
Second, F. W. Damon	2 00
Third, Charles F. Curtis	1 00
Comice:	
First, A. T Brown	3 00
Second, L. M. Chase	2 00
Dana's Hovey:	
First, A. T. Brown	4 00
Second, F. W. Damon	3 00
Third, Mrs. Charles Whittier	2 00
Fourth, M. W. Chadbourne	1 00
Diel:	
First, A. T. Brown	3 00
Second, Charles E. Swain	2 00
Third, Sumner Coolidge	1 00
Fulton:	
First, E. S. Converse	3 00
Second, F. L. Weston	2 00
Third, Warren Fenno	1 00
Hardy:	
First, Charles F. Curtis	3 00
Second, Warren Fenno	2 00
Third, E. S. Converse	1 00
Howell:	
First, Sumner Coolidge	3 00
Second, J. E. Fuller	2 00
Third, Warren Fenno	1 00
Josephine of Malines:	
First, Warren Fenno	3 00
Lawrence:	
First, L. M. Chase	3 00
Second, Charles E. Swain	2 00
Third, A. T. Brown	1 00
Louise Bonne of Jersey:	
First, L. M. Chase	3 00
Second, A. T. Brown	2 00
Third, Edwin A. Hall	1 00
Marie Louise:	
First, Elbridge Torrey	3 00
Second, Charles E. Swain	2 00
Third, Warren Fenno	1 00
Merriam:	
First, F. W. Damon	3 00
Second, Sumner Coolidge	2 00
Third, Charles F. Curtis	1 00

Onondaga:	
First, Matthew Binney	3 00
Second, Sumner Coolidge	2 00
Third, John L. Bird	1 00
Seckel:	
First, Miss Elizabeth Miller	4 00
Second, E. S. Converse	3 00
Third, E. E. Doran	2 00
Fourth, Charles Whittier	1 00
Sheldon:	
First, George V. Fletcher	4 00
Second, Mrs. A. C. Wiggin	3 00
Third, William Patterson	2 00
Fourth, Sumner Coolidge	1 00
St. Michael Archangel:	
First, Warren Fenno	3 00
Second, Warren Heustis & Son	2 00
Superfin:	
First, F. W. Damon	3 00
Second, Sumner Coolidge	2 00
Third, Warren Fenno	1 00
Urbaniste:	
First, E. S. Converse	3 00
Second, John L. Bird	2 00
Third, A. T. Brown	1 00
Vicar:	
First, E. S. Converse	3 00
Second, A. T. Brown	2 00
Third, George E. Freeman	1 00
Winter Nells:	
First, A. T. Brown	3 00
Second, William Barton	2 00
Third, Edwin A. Hall	1 00
Any other variety:	
First, Warren Heustis & Son, Bonne d'Ezée	3 00
Second, Warren Fenno, Adams	2 00
Third, E. W. Green, Washington	1 00
QUINCES.—Champion:	
First, Charles S. Smith	3 00
Second, George V. Fletcher	2 00
Orange:	
First, George V. Fletcher	3 00
Second, Ira A. Nay	2 00
Third, J. S. Chase	1 00
Pear:	
First, George V. Fletcher	3 00
Second, Ira A. Nay	2 00
Third, George L. Brown	1 00

Rea:
First, Warren Fenno 3 00
Any other variety:
First, J. S. Chase, Meech 3 00
PEACHES.—Late Crawford:
First, Sumner Coolidge 3 00
Second, Walter A. Robinson 2 00
Third, E. M. Bruce 1 00
Any other variety:
First, W. D. Hinds, Crosby 3 00
Second, William Milman, Hind 2 00
Third, Sumner Coolidge, Crosby 1 00
PLUMS.—Yellow Egg:
First, George V. Fletcher 2 00
Any other variety:
First, W. D. Hinds, Satsuma 2 00
Second, H. R. Kinney, Lombard 1 00
NATIVE GRAPES.—Six bunches of Brighton:
First, J. S. Chase 3 00
Second, F. W. Damon 2 00
Third, Charles W. Libby 1 00
Delaware:
First, Charles W. Libby 4 00
Second, J. S. Chase 3 00
Third, F. W. Damon 2 00
Fourth, H. R. Kinney 1 00
Eumelan:
First, J. S. Chase 3 00
Herbert:
First, Charles W. Libby 3 00
Second, J. S. Chase 2 00
Iona:
First, F. W. Damon 3 00
Second, Thomas H. Talbot 2 00
Third, J. S. Chase 1 00
Lindley:
First, Charles W. Libby 3 00
Second, F. W. Damon 2 00
Niagara:
First, E. A. Adams 3 00
Second, George V. Fletcher 2 00
Third, J. S. Chase 1 00
Pocklington:
First, F. W. Damon 4 00
Second, Charles W. Libby 3 00
Third, J. S. Chase 2 00
Fourth, H. R. Kinney 1 00

Prentiss:	
First, F. W. Damon	3 00
Second, A. T. Brown	2 00
Third, J. S. Chase	1 00
Wilder:	
First, E. A. Adams	3 00
Any other variety:	
First, J. S. Chase, Vergennes	3 00
Second, J. S. Chase, Diana	2 00
Third, F. W. Damon, Moore's Diamond	1 00
Any variety from girdled vines:	
First, H. R. Kinney, Concord	3 00
Second, H. R. Kinney, Agawam	2 00
CRANBERRIES.—Half peck:	
First, L. J. Fosdick, McFarlin's	3 00
Second, L. J. Fosdick, Gloriana	2 00
Third, L. J. Fosdick, Early Black	1 00

Gratuities:—

M. W. Chadbourne, Apples and Pears	1 00
Hon. Aaron Low, Plums	1 00
J. S. Chase, Grapes	1 00

OCTOBER 13.

Gratuities:—

J. T. Gilman, Peaches	1 00
Hon. Aaron Low, Grapes	1 00
J. S. Chase "	1 00

EXHIBITION OF WINTER FRUITS AND VEGETABLES.

NOVEMBER 17.

Benjamin V. French Fund.

APPLES.—Baldwin, E. F. Locke	5 00
Rhode Island Greening, C. F. Boyden	5 00

Society's Prizes.

APPLES.—Baldwin:	
First, E. M. Bruce	3 00
Second, C. F. Boyden	2 00
Third, J. C. Stone	1 00

Danvers Sweet:	
First, W. H. Boyden	3 00
Second, Warren Fenno	2 00
Third, C. M. Handley	1 00
Fletcher Russet:	
First, George V. Fletcher	3 00
Hubbardston:	
First, Artemas Frost	3 00
Second, M. W. Chadbourne	2 00
Third, W. H Boyden	1 00
Hunt Russet:	
First, W. H. Boyden	3 00
Second, C. Terry	2 00
Lady's Sweet:	
Second, William C. Winter	2 00
Northern Spy:	
First, A. E. Hartshorn	3 00
Second, E. M. Bruce	2 00
Third, George V. Fletcher	1 00
Rhode Island Greening:	
First, E. M. Bruce	3 00
Second, C. F. Boyden	2 00
Third, A. E. Hartshorn	1 00
Roxbury Russet:	
First, W. H. Boyden	3 00
Second, Miss E. J. Cutter	2 00
Third, A. E. Hartshorn	1 00
Tolman Sweet:	
First, George V. Fletcher	3 00
Second, W. P. Plimpton	2 00
Third, Mrs. A. E. Underwood	1 00
Tompkins King:	
First, C. F. Boyden	3 00
Second, J. G. Drew	1 00
Third, George C. Rice	1 00
Any other variety:	
First, A. E. Hartshorn, Sutton	3 00
Second, George C. Rice, Mackintosh	2 00
Third, William H. Spooner, Wagener	1 00
PEARS.—Angouleme:	
First, A. T. Brown	4 00
Second, Warren Fenno	3 00
Third, F. W. Damon	2 00
Fourth, William Milman	1 00
Anjou:	
First, William Milman	4 00
Second, F. W. Damon	3 00

Third, A. K. Gould	2 00
Fourth, E. M. Bruce	1 00
Clairgeau:	
First, F. W. Damon	3 00
Second, A. K. Gould	2 00
Third, M. W. Chadbourne	1 00
Comice:	
First, Warren Fenno	3 00
Dana's Hovey:	
First, A. T. Brown	4 00
Second, F. W. Damon	3 00
Third, Charles Whittier	2 00
Fourth, Warren Fenno	1 00
Diel:	
First, A. T. Brown	3 00
Second, Edwin A. Hall	2 00
Glout Morceau:	
First, Edwin A. Hall	3 00
Second, Mrs. A. A. Johnson	2 00
Josephine of Malines:	
First, Warren Fenno	3 00
Second, J. L. Bird	2 00
Langelier:	
First, William H. Spooner	3 00
Second, F. W. Damon	2 00
Third, A. T. Brown	1 00
Lawrence:	
First, Warren Fenno	3 00
Second, A. T. Brown	2 00
Third, M. W. Chadbourne	1 00
Vicar:	
First, A. T. Brown	3 00
Second, C. A. Jones	2 00
Third, E. S. Converse	1 00
Winter Nelis:	
First, A. T. Brown	3 00
Second, Theodore M. Plimpton	2 00
Third, William Barton	1 00
Any other variety:	
First, F. W. Damon, Superfin	3 00
Second, C. B. Wiggin, Sheldon	2 00
Third, George V. Fletcher, Bosc	1 00
QUINCES.—Any variety:	
First, J. S. Chase, Champion	3 00
Second, J. S. Chase, Meech	2 00
Third, E. M. Bruce, Champion	1 00

Gratuities:—

J. S. Chase, Grapes	2 00
H. W. Trowbridge, Cranberries	1 00
L. J. Fosdick "	1 00
C. Terry "	1 00

E. W. Wood,
Charles F. Curtis,
O. B. Hadwen,
Warren Fenno,
Samuel Hartwell,
J. Willard Hill,
Sumner Coolidge,
} *Committee on Fruits.*

REPORT

OF THE

COMMITTEE ON VEGETABLES.

FOR THE YEAR 1900.

By WARREN HOWARD HEUSTIS, CHAIRMAN.

At this time of the year we look backward to see where we could have improved. Owing to an extremely dry season, we naturally looked for poor specimens, but we were pleased to find that the vegetables came up to the usual high standard. There were more exhibits of good vegetables this year than for some time past. We have a few new growers and most of the old ones still favor us. The shows during the winter and in fact during the entire season were very well sustained and the competition was quite keen and for the most part good natured, and, while there were no remarkable exhibits, the tone of the whole was quite high.

On July 14 some very fine specimens of new Hybrid Melons were shown by Elbridge T. Gerry of Newport, R. I., (Arthur Griffin, gardener) and were awarded a First Class Certificate of Merit.

A new Tomato, Maule's 1900, shown for the first time, seems to be worthy of general cultivation.

At the Annual Fruit and Vegetable Show, E. C. Lewis was awarded the Society's Silver Medal for about a hundred varieties of well grown vegetables. The Culinary Herbs at this show attracted a great deal of attention and inquiry and were worthy of special mention.

During the year we have awarded in prizes and gratuities $1,177, leaving an unexpended balance of $23.

For the Committee,

WARREN HOWARD HEUSTIS, *Chairman.*

PRIZES AND GRATUITIES AWARDED FOR VEGETABLES.

1900.

JANUARY 6.

RADISHES.— Four bunches of any variety:	
First, A. E. Hartshorn	$3 00
Second, George D. Moore	2 00
SALSIFY.— Twelve specimens:	
First, Warren Heustis & Son	3 00
Second, D. L. Tappan	2 00
Third, A. E. Hartshorn	1 00
CUCUMBERS.— Pair of any variety:	
First, Mrs. John L. Gardner	3 00
CAULIFLOWERS.— Four specimens:	
First, C. M. Handley	3 00
CELERY.— Four roots:	
First, Warren Heustis & Son, Boston Market	3 00
Second, Warren Heustis & Son, Paris Golden	2 00
Third, Warren Heustis & Son, Giant Pascal	1 00
PARSLEY.— Two quarts:	
First, W. N. Craig, Dobbie's Selected	2 00
Second, W. N. Craig, Chappell's Matchless	1 00
TOMATOES.— Twelve specimens:	
First, Francis Blake, Best of All	3 00
Second, Francis Blake, Conference	2 00
Third, W. C. Winter, Stone	1 00
Gratuities:—	
C. M. Handley, Cauliflowers	1 00
A. E. Hartshorn, Collection	3 00
Warren Heustis & Son, "	1 00

JANUARY 13.

Gratuity:—	
Mrs. E. M. Gill, Mushrooms	1 00

JANUARY 27.

Gratuities:—	
Mrs. E. M. Gill, Tomatoes	1 00
George D. Moore, Lettuce	1 00

FEBRUARY 3.

RADISHES.— Four bunches of any variety:	
First, Varnum Frost	3 00
Second, A. E. Hartshorn	2 00
Third, A. F. Coolidge	1 00

SALSIFY.— Twelve specimens:

First, Warren Heustis & Son	3 00
Second, D. L. Tappan	2 00
Third, A. E. Hartshorn	1 00

CELERY.— Four roots:

First, Warren Heustis & Son, Boston Market	3 00
Second, Warren Heustis & Son, Giant Pascal	2 00
Third, A. E. Hartshorn	1 00

LETTUCE.— Four heads of Tennisball:

First, George D. Moore	3 00
Second, A. E. Hartshorn	2 00
Third, A. F. Coolidge	1 00

TOMATOES.— Twelve specimens:

First, Francis Blake, Best of All	3 00
Second, H. Dumaresq, " "	2 00
Third, S. J. Goddard, Eclipse	1 00

Gratuities:—

A. E. Hartshorn, Collection	3 00
Warren Heustis & Son, "	2 00
Mrs. E. M. Gill, "	1 00

FEBRUARY 10.

Gratuity:—

Warren Heustis & Son, Collection	1 00

FEBRUARY 24.

Gratuities:—

Hon. Aaron Low, Collection	1 00
Warren Heustis & Son, "	1 00

MARCH 3.

Gratuities:—

Hon. Aaron Low, Spinach	1 00
Warren Heustis & Son, Celery	1 00

MARCH 10.

Gratuities:—

George D. Moore, Lettuce	1 00
Wyman Brothers, "	1 00
Mrs. E. M. Gill, Tomatoes	1 00
Hon. Aaron Low, Spinach	1 00
Warren Heustis & Son, Collection	2 00

SPRING EXHIBITION.

MARCH 20, 21, 22, AND 23.

William J. Walker Fund.

RADISHES.— Four bunches of Turnip Rooted:	
First, Varnum Frost	2 00
Second, A. E. Hartshorn	1 00
CUCUMBERS.— Pair of White Spine:	
First, E. M. Bruce	3 00
Second, Irving B. Frost	2 00
Third, Francis Blake	1 00
SPINACH.— Half-peck:	
First, Hon. Aaron Low, Improved Thick Leaved	3 00
Second, Hon. Aaron Low, Parisian	2 00
Third, Hon. Aaron Low, Victoria	1 00
DANDELIONS.— Peck:	
First, J. C. Stone	3 00
Second, A. E. Hartshorn	2 00
LETTUCE.— Four heads of Tennisball:	
First, Wyman Brothers	3 00
Second, A. E. Hartshorn	2 00
Third, George D. Moore	1 00
WATER CRESS.— Two quarts:	
First, A. E. Hartshorn	2 00
PARSLEY.— Two quarts:	
First, S. J. Goddard, Extra Triple Curled	2 00
Second, S. J. Goddard, Chappell's Matchless	1 00
RHUBARB.— Twelve stalks:	
First, Wyman Brothers	3 00
Second, W. H. Derby	2 00
Third, George Sanderson	1 00
TOMATOES.— Twelve specimens:	
First, Francis Blake	3 00
Gratuities:—	
Mrs. John L. Gardner, Cucumbers	1 00
Wyman Brothers, Lettuce	1 00
A. E. Hartshorn, Collection	3 00

MARCH 31.

Gratuity:—	
George D. Moore, Lettuce	1 00

APRIL 7.

BEETS.— Twelve specimens of Turnip Rooted:	
First, A. Nixon	3 00
Second, W. Warburton	2 00

PARSNIPS.— Twelve specimens:

First, A. Nixon	3 00
Second, Warren Heustis & Son	2 00
Third, W. Warburton	1 00

RADISHES.— Four bunches:

First, A. E. Hartshorn	2 00

LETTUCE.— Four heads:

First, George D. Moore	3 00
Second, A. E. Hartshorn	2 00
Third, Wyman Brothers	1 00

CUCUMBERS.— Pair of White Spine:

First, William Proctor	3 00
Second, George D. Moore	2 00

Any other variety:

First, Mrs. John L. Gardner, Telegraph	3 00
Second, Mrs. John L. Gardner, Sion House	2 00

Gratuities:—

Hon. Aaron Low, Spinach	1 00
W. H. Derby, Rhubarb	1 00
Hon. Aaron Low, Collection of Potatoes	5 00
Warren Heustis & Son, Collection	1 00
Wyman Brothers, "	1 00
A. E. Hartshorn, "	1 00
George D. Moore, "	1 00

APRIL 21.

Gratuity:—

Warren Heustis & Son, Dandelions	1 00

APRIL 28.

Gratuity:—

Warren Heustis & Son, Dandelions	1 00

MAY 5.

William J. Walker Fund.

ASPARAGUS.— Four bunches:

First, Varnum Frost	3 00
Second, William H. Hunt	2 00
Third, Norris F. Comley	1 00

CUCUMBERS.— Pair of White Spine:

First, George D. Moore	3 00
Second, William Proctor	2 00
Third, A. F. Coolidge	1 00

Any other variety:

First, Mrs. John L. Gardner	3 00
Second, Mrs. John L. Gardner	2 00

SPINACH.— Peck:	
First, A. E. Hartshorn	3 00
DANDELIONS.— Peck:	
First, Varnum Frost	2 00
Second, W. H. Derby	1 00
LETTUCE.— Four heads:	
First, Edward Powell	3 00
Second, W. H. Derby	2 00
Third, A. E. Hartshorn	1 00
RHUBARB.— Twelve stalks, open culture:	
First, George D. Moore	3 00
Second, A. E. Hartshorn	2 00
Third, Warren Heustis & Son	1 00
TOMATOES.— Twelve specimens:	
First, Edward Powell, Frogmore	3 00
Second, E. M. Bruce, Best of All	2 00
Third, Francis Blake, " "	1 00
Gratuities:—	
Mrs. E. M. Gill, Rhubarb	1 00
George B. Gill, "	1 00
Edward Powell, Collection	2 00
Hon. Aaron Low, "	1 00
George D. Moore, "	1 00
Warren Heustis & Son, "	1 00

MAY 12.

Gratuities:—	
George D. Moore, Radishes	1 00
Warren Heustis & Son, Rhubarb	1 00

MAY 19.

Gratuities:—	
Warren Heustis & Son, Radishes	1 00
W. H. Hunt, Asparagus	1 00
Hon. Aaron Low, Rhubarb	1 00
Edward Powell, Collection	3 00

MAY 26.

Gratuities:—	
Norris F. Comley, Asparagus	1 00
W. H. Hunt, "	1 00
Warren Heustis & Son, Collection	1 00

JUNE 2.

Gratuities:—	
Warren Heustis & Son, Lettuce	1 00
Mrs. E. M. Gill, Rhubarb	1 00
George D. Moore, Collection	1 00

JUNE 9.

Gratuities:—

George D. Moore, Cucumbers	1 00
Warren Heustis & Son, Lettuce	1 00

RHODODENDRON SHOW.

JUNE 12 AND 13.

Theodore Lyman Fund.

BEETS.—Twelve specimens:	
First, A. E. Hartshorn	3 00
Second, George D. Moore	2 00
CARROTS.—Twelve specimens:	
First, Edward Powell, Sutton's	3 00
Second, Edward Powell, Early Horn	2 00
Third, A. E. Hartshorn, " "	1 00
RADISHES.—Four bunches of Turnip Rooted:	
First, George D. Moore	2 00
Second, A. E. Hartshorn	1 00
Long Scarlet:	
First, Warren Heustis & Son	2 00
Second, George D. Moore	1 00
ASPARAGUS.—Four bunches, twelve stalks each:	
First, W. H. Hunt	3 00
Second, Norris F. Comley	2 00
Third, A. E. Hartshorn	1 00
CUCUMBERS.—Pair:	
First, George D. Moore	3 00
Second, J. C. Stone	2 00
Third, W. H. Derby	1 00
LETTUCE.—Four heads:	
First, Warren Heustis & Son, Big Boston	3 00
Second, George D. Moore, Tennisball	2 00
Third, Warren Heustis & Son, "	1 00
RHUBARB.—Twelve stalks:	
First, Warren Heustis & Son, Victoria	3 00
Second, Warren Heustis & Son, Seedling	2 00
Third, Edward Powell, Victoria	1 00

Gratuities:—

James Anderson, Parsley,	1 00
Warren Heustis & Son, Collection	3 00
George D. Moore, "	3 00
Edward Powell, "	3 00
A. E. Hartshorn, "	2 00

JUNE 16.

Gratuities:—

W. H. Hunt, Asparagus	1 00
A. W. Crockford, Cucumbers	1 00
George D. Moore, "	1 00
W. C. Winter, Tomatoes	1 00
Edward Powell, Collection	2 00
Mrs. John L. Gardner, "	1 00

ROSE AND STRAWBERRY SHOW.

JUNE 22 and 23.

BEETS. — Twelve Summer Turnip Rooted:	
First, A. E. Hartshorn	3 00
Second, J. C. Stone	2 00
Third, George D. Moore	1 00
ONIONS. — Twelve specimens:	
First, Edward Powell	3 00
Second, Edward Powell	2 00
Third, George D. Moore	1 00
CUCUMBERS. — Pair of White Spine:	
First, George D. Moore	3 00
Second, J. C. Stone	2 00
Third, A. W. Crockford	1 00
Any other variety:	
Second, Edward Powell	2 00
CABBAGES. — Three of any variety, trimmed:	
First, George D. Moore	3 00
Second, George D. Moore	2 00
Third, Warren Heustis & Son	1 00
LETTUCE. — Four heads of Tennisball:	
First, E. C. Lewis	3 00
Second, George D. Moore	2 00
Third, Warren Heustis & Son	1 00
Any other variety:	
First, E. C. Lewis	3 00
Second, Edward Powell	2 00
PEAS. — Half-peck of Nott's Excelsior:	
First, J. W. Burns	3 00
Second, A. E. Hartshorn	2 00
Third, Mrs. John L. Gardner	1 00
Any other variety:	
First, Edward Powell	3 00
Second, A. E. Hartshorn	2 00
Third, W. Warburton	1 00

Gratuities:—

Warren Heustis & Son, Collection	5 00
George D. Moore, "	3 00
W. C. Winter, "	2 00
A. E. Hartshorn, "	1 00
W. H. Hunt, "	1 00

JUNE 30.

POTATOES. — Twelve specimens:	
First, George D. Moore	3 00
ONIONS. — Twelve specimens:	
First, Edward Powell	2 00
Second, George D. Moore	1 00
SQUASHES. — Four Long Warted:	
First, J. C. Stone	3 00
Four Scalloped:	
First, J. C. Stone	3 00
CABBAGES. — Three of any variety:	
First, George D. Moore	3 00
Second, George D. Moore	2 00
Third, Warren Heustis & Son	1 00
BEANS. — Half-peck of Wax:	
First, John Sheahan	3 00
PEAS.— Half-peck of American Wonder:	
First, A. E. Hartshorn	3 00
Any other variety:	
First, Edward Powell, Gradus	3 00
Second, E. C. Lewis, "	2 00
Third, George D. Moore	1 00

Gratuities:—

Marcellus A. Patten, Tomatoes	1 00
Warren Heustis & Son, Collection	2 00
E. C. Lewis, "	2 00
George D. Moore, "	2 00
Edward Powell, "	1 00
W. Warburton, "	1 00

JULY 7.

Levi Whitcomb Fund.

POTATOES.— Twelve specimens:	
First, George D. Moore, Bovee	3 00
Second, George D. Moore, Hebron	2 00
CABBAGES.— Three Drumhead, trimmed:	
First, George D. Moore	3 00
Second, George D. Moore	2 00
Third, Warren Heustis & Son	1 00

LETTUCE.—Four heads:	
First, Miss M. S. Walker, Sutton's Giant	3 00
Second, E. C. Lewis, Salamander	2 00
Third, E. C. Lewis, Deacon	1 00
BEANS.—Half-peck of Wax:	
First, A. E. Hartshorn	3 00
Second, J. C. Stone	2 00
Third, I. E. Coburn	1 00
Half-peck of any green variety:	
First, I. E. Coburn, Cranberry	3 00
Second, J. C. Stone, Mohawk	2 00
Third, George D. Moore, "	1 00
TOMATOES.—Twelve specimens, open culture:	
First, E. C. Lewis	3 00
Gratuities:—	
George B. Gill, Peas	1 00
Warren Heustis & Son, Collection	3 00
E. C. Lewis, "	2 00
George D. Moore, "	2 00
A. E. Hartshorn, "	1 00

JULY 14.

POTATOES.—Twelve specimens:	
First, J. W. Burns, Bovee	3 00
Second, George D. Moore, "	2 00
Third, E. C. Lewis, Bliss's Triumph	1 00
LETTUCE.—Four heads of Tennisball:	
First, A. E. Hartshorn	2 00
Second, Warren Heustis & Son	1 00
Any other variety:	
First, E. C. Lewis	2 00
PEAS.—Half-peck of Stratagem:	
First, George B. Gill	3 00
Second, A. E. Hartshorn	2 00
Half-peck of any other variety:	
First, A. E. Hartshorn, Telephone	3 00
Second, E. C. Lewis, Carter's Daisy	2 00
Third, E. C. Lewis, Gradus	1 00
TOMATOES.—Twelve specimens:	
First, Varnum Frost	3 00
Second, J. C. Stone	2 00
Gratuities:—	
E. C. Lewis, Collection	2 00
A. E. Hartshorn, "	2 00
Warren Heustis & Son, "	2 00

Edward Powell Collection,	2 00
Hon. Aaron Low, "	1 00
J. W. Burns, "	1 00

Elbridge T. Gerry, Newport, R I., New Hybrid Melons, First Class Certificate of Merit.

JULY 21.

POTATOES.— Twelve specimens:	
First, H. R. Kinney, Somerset	3 00
Second, E. C. Lewis	2 00
Third, George D. Moore	1 00
SWEET CORN.— Twelve ears of Crosby:	
First, George D. Moore	3 00
Any other variety:	
First, J. C. Stone	3 00
Second, George D. Moore	2 00
TOMATOES.— Twelve specimens:	
First, A. E. Hartshorn, Acme	3 00
Second, Varnum Frost, Comrade	2 00
Third, J. C. Stone, Atlantic	1 00
Gratuities:—	
Edward Powell, Collection	2 00
Warren Heustis & Son, "	2 00
E. C. Lewis, "	2 00
J. W. Burns, "	1 00
Hon. Aaron Low, "	1 00

JULY 28.

BEETS.— Twelve specimens:	
First, J. C. Stone	3 00
Second, E. C. Lewis	2 00
Third, A. E. Hartshorn	1 00
TURNIPS.— Twelve specimens:	
First, George F. Wheeler	2 00
CABBAGES.— Three specimens:	
First, George D. Moore	3 00
Second, Warren Heustis & Son	2 00
Third, Warren Heustis & Son	1 00
BEANS.— Two quarts of Goddard, shelled:	
First, I. E. Coburn	3 00
Horticultural:	
First, Joseph Thorpe	3 00
Second, I. E. Coburn	2 00
Third, J. C. Stone	1 00
TOMATOES.— Twelve specimens:	
First, A. E. Hartshorn	3 00

Second, A. F. Coolidge	2 00
Third, J. C. Stone	1 00
EGG PLANT.— Four specimens of Round Purple:	
First, Sumner Coolidge	3 00
Second, A. F. Coolidge	2 00
Gratuities:—	
George D. Moore, Collection	2 00
E. C. Lewis, "	2 00
A. E. Hartshorn, "	2 00
Warren Heustis & Son, "	2 00
Hon. Aaron Low, "	1 00

AUGUST 4.

CARROTS.— Twelve specimens:	
First, W. Warburton	3 00
Second, E. C. Lewis	2 00
Third, A. E. Hartshorn	1 00
SALMON FLESH MELONS.— Four specimens:	
First, George D. Moore	3 00
Second, Varnum Frost	2 00
SWEET CORN.— Twelve ears:	
First, Sumner Coolidge	3 00
Second, E. C. Lewis	2 00
Third, George D. Moore	1 00
TOMATOES.— Twelve specimens:	
First, W. H. Hunt	3 00
Second, Varnum Frost	2 00
Third, Hon. Aaron Low	1 00
EGG PLANT.— Four specimens:	
First, Sumner Coolidge	3 00
Second, Joseph Thorpe	2 00
Third, A. F. Coolidge	1 00
Gratuities:—	
A. E. Hartshorn, Collection	2 00
Joseph Thorpe, "	1 00
Hon. Aaron Low, "	1 00
E. C. Lewis, "	1 00

AUGUST 11

POTATOES.— Twelve specimens:	
First, E. C. Lewis, Hebron	3 00
Second, W. Warburton, Bovee	2 00
Third, E. C. Lewis, White Elephant	1 00
ONIONS.— Twelve specimens:	
First, E. C. Lewis, Prize Taker	3 00

Second, W. J. Clemson, Prize Taker	2 00
Third, W. J. Clemson, Danvers	1 00
GREEN FLESH MELONS.— Four specimens:	
First, A. E. Hartshorn	3 00
SALMON FLESH MELONS.— Four specimens:	
First, Varnum Frost	3 00
Second, George D. Moore	2 00
Third, J. C. Stone	1 00
CELERY.— Four roots of any variety:	
First, A. F. Coolidge	3 00
Second, Warren Heustis & Son	2 00
Third, W. Warburton	1 00
BEANS.— Two quarts of Lima:	
First, Sumner Coolidge, Large Lima	3 00
Second, Sumner Coolidge, Small Lima	2 00
Two quarts of Goddard, shelled:	
First, A. E. Hartshorn	3 00
Second, D. L. Fiske	2 00
SWEET CORN.— Twelve ears of Potter's Excelsior:	
First, Mrs. E. M. Gill	3 00
Second, Sumner Coolidge	2 00
Any other variety:	
First, A. E. Hartshorn, Moore's	3 00
Second, E. C. Lewis, Crosby	2 00
TOMATOES.— Twelve specimens:	
First, A. F. Coolidge	3 00
Second, J. C. Stone	2 00
Third, Joseph Thorpe	1 00
PEPPERS.— Twelve specimens of Squash:	
First, Hon. Aaron Low	3 00
Second, N. T. Kidder	2 00
Third, E. C. Lewis	1 00
Any other variety:	
First, E. C. Lewis, Bull Nose	3 00
Second, E. C. Lewis, Ruby King	2 00
Gratuities:—	
A. E. Hartshorn, Collection	2 00
W. Warburton, "	2 00
Joseph Thorpe, "	1 00
Hon. Aaron Low, "	1 00

AUGUST 18.

BEETS.— Twelve specimens:	
First, George D. Moore	3 00
Second, E. C. Lewis	2 00
Third, J. C. Stone	1 00

GREEN FLESH MELONS.—Four specimens:

First, A. E. Hartshorn	3 00

SALMON FLESH MELONS.—Four specimens:

First, Varnum Frost	3 00
Second, J. C. Stone	2 00

WATERMELONS.—Pair:

First, C. Terry	3 00
Second, J. C. Stone	2 00

CABBAGES.—Three of any variety, trimmed:

First, Warren Heustis & Son, Number 2	3 00
Second, Warren Heustis & Son, All Seasons	2 00

CELERY.—Four roots:

First, A. F. Coolidge	3 00
Second, W. Warburton	2 00
Third, Warren Heustis & Son	1 00

BEANS.—Two quarts of Large Lima:

First, E. C. Lewis	3 00
Second, A. E. Hartshorn	2 00

Two quarts of Small Lima:

First, J. C. Stone	3 00
Second, W. Warburton	2 00
Third, A. E. Hartshorn	1 00

MARTYNIAS.—Twelve specimens:

First, E. S. Converse	2 00
Second, E. C. Lewis	1 00

NATIVE MUSHROOMS.—Named collection, of not less than five edible varieties:

First, Miss Alice L. Grinnell	3 00
Second, Miss Ellen W. Rumrill	2 00

Gratuities:—

A. E. Hartshorn, Collection	2 00
Hon. Aaron Low, "	1 00
E. C. Lewis, "	1 00
Warren Heustis & Son, "	1 00

AUGUST 25.

Gratuities:—

A. A. Marshall, Melons	1 00
Warren Heustis & Son, Salsify	1 00
Hon. Aaron Low, Collection	1 00

SEPTEMBER 1.

Gratuities:—

George B. Gill, Collection	1 00
Mrs. E. M. Gill, "	1 00
Hon. Aaron Low, "	1 00

SEPTEMBER 15.

TURNIPS.—Twelve specimens:	
First, E. C. Lewis	3 00
WATERMELONS.—Pair:	
First, E. C. Lewis	3 00
Second, J. C. Stone	2 00
Third, A. E. Hartshorn	1 00
CAULIFLOWERS.—Four specimens:	
First, C. M. Handley	3 00
Second, W. H. Teele	2 00
Third, De Souza Brothers	1 00
LETTUCE.—Four heads of any variety:	
First, Sumner Coolidge	3 00
Second, A. F. Coolidge	2 00
Third, E. C. Lewis	1 00
CELERY.—Four roots of any variety:	
First, W. Warburton	3 00
Second, A. F. Coolidge	2 00
Third, Joseph Thorpe	1 00
PARSLEY.—Two quarts:	
First, W. J. Clemson	2 00
Second, W. J. Clemson	1 00
BEANS.—Two quarts of Large Lima:	
First, Mrs. E. M. Gill	3 00
Second, E. C. Lewis	2 00
Third, C. M. Handley	1 00
SWEET CORN.—Twelve ears of any variety:	
First, O. R Robbins	3 00
Second, E. C. Lewis	2 00
Third. A. F. Coolidge	1 00
EGG PLANTS.—Four Round Purple:	
First, A. W. Crockford	3 00
Second, E. C. Lewis	2 00
Third, A. F. Coolidge	1 00
TOMATOES.—Twelve Aristocrat:	
First, Varnum Frost	3 00
Second, A. F. Coolidge	2 00
Third, Warren Heustis & Son	1 00
Comrade:	
First, Warren Heustis & Son	3 00
Second, A. F. Coolidge	2 00
Third, Hon. Aaron Low	1 00
May's Favorite:	
First, Hon. Aaron Low	3 00
Second, Warren Heustis & Son	2 00
Third, Varnum Frost	1 00

Any other variety:

First, Hon. Aaron Low, Maule's 1900	3 00
Second, Joseph Thorpe, Stone	2 00
Third, Varnum Frost, "	1 00

MARTYNIAS.—Twelve specimens:

First, E. S. Converse	2 00
Second, W. J. Clemson	1 00

PEPPERS.—Twelve specimens of Squash:

First, Hon. Aaron Low	2 00
Second, George Lincoln	1 00

Any other variety:

First, E. C. Lewis	2 00
Second, A. E. Hartshorn	1 00

NATIVE MUSHROOMS.—Named collection, not less than five edible varieties:

First, Miss Alice L. Grinnell	3 00

Gratuities:—

A. E. Hartshorn, Collection	1 00
E. C. Lewis, "	1 00
Warren Heustis & Son, "	1 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

SEPTEMBER 27 AND 28.

BEETS.—Twelve Turnip Rooted:

First, George D. Moore	3 00
Second, A. E. Hartshorn	2 00
Third, E. C. Lewis	1 00

CARROTS.—Twelve Long Orange:

First, H. R. Kinney	3 00
Second, E. C. Lewis	2 00
Third, W. Warburton	1 00

Twelve Intermediate:

First, H. R. Kinney	3 00
Second, George D. Moore	2 00
Third, H. R. Kinney	1 00

PARSNIPS.—Twelve Long:

First, George D. Moore	3 00
Second, Warren Heustis & Son	2 00
Third, A. E. Hartshorn	1 00

POTATOES.—Twelve Carman No. 1:

First, E. C. Lewis	3 00
Second, Elliott Moore	2 00

Clark:

First, E. C. Lewis	3 00
Second, H. R. Kinney	2 00
Third, Hon. Aaron Low	1 00

Early Fortune:	
First, Hon. Aaron Low	3 00
Second, J. W. Burns	2 00
Hebron:	
First, H. R. Kinney	3 00
Second, De Souza Brothers	2 00
Third, Walter Warburton	1 00
Rose:	
First, E. C. Lewis	3 00
Second, H. R. Kinney	2 00
Third, J. W. Burns	1 00
Any other variety:	
First, E. A. Adams, New Queen	3 00
Second, H. R. Kinney, Sir Walter Raleigh	2 00
Third, H. R. Kinney, Bovee	1 00
SALSIFY.— Twelve specimens:	
First, George D. Moore	3 00
Second, Warren Heustis & Son	2 00
Third, E. C. Lewis	1 00
TURNIPS.— Twelve Flat:	
First, E. C. Lewis	3 00
Second, George F. Wheeler	2 00
Third, W. Wheeler	1 00
Swedish:	
First, E. C. Lewis	3 00
ONIONS.— Twelve Danvers:	
First, Perley Davis	3 00
Second, W. J. Clemson	2 00
Third, E. M. Bruce	1 00
Red:	
First, E. C. Lewis	3 00
Second, W. J. Clemson	2 00
Third, Perley Davis	1 00
White:	
First, Perley Davis	2 00
Second, A. E. Hartshorn	1 00
Any other variety:	
First, Perley Davis, Prize Taker	3 00
Second, W. J. Clemson, "	2 00
Third, E. C. Lewis, Asa Craig	1 00
SQUASHES.— Three Bay State:	
First, George F. Wheeler	3 00
Second, A. E. Hartshorn	2 00
Third, Wilfred Wheeler	1 00
Hubbard:	
First, A. F. Coolidge	3 00
Second, A. E. Hartshorn	2 00
Third, E. C. Lewis	1 00

Hybrid Turban:	
First, A. E. Hartshorn	3 00
Second, E. C. Lewis	2 00
Marblehead:	
First, E. C. Lewis	3 00
Marrow:	
First, E. C. Lewis	3 00
Second, George F. Wheeler	2 00
Any other variety:	
First, A. E. Hartshorn, Seedling	3 00
Second, Hon. Aaron Low, No. 10	2 00
Third, A. E. Hartshorn, Warren	1 00
CUCUMBERS.— Pair of White Spine:	
First, W. A. Bruce	3 00
Second, E. M. Bruce	2 00
Any other variety:	
First, Joseph Thorpe, Emerald	3 00
Second, D. T. Curtis, Japan Tree	2 00
WATERMELONS.— Two specimens:	
First, E. C. Lewis	3 00
Second, E. C. Lewis	2 00
Third, Elliott Moore	1 00
BRUSSELS SPROUTS.— Half-peck:	
First, A. E. Hartshorn	3 00
Second, A. E. Hartshorn	2 00
Third, George F. Wheeler	1 00
CABBAGES.— Three Drumhead, trimmed:	
First, A. Nixon	3 00
Second, Hon. Aaron Low	2 00
Third, E. C. Lewis	1 00
Red:	
First, W. Warburton	3 00
Second, E. C. Lewis	2 00
Third, A. Nixon	1 00
Savoy:	
First, Hon. Aaron Low	3 00
Second, W. Warburton	2 00
Third, A. Nixon	1 00
CAULIFLOWERS.— Four specimens:	
First, C. M. Handley	5 00
Second, W. H. Teele	4 00
Third, De Souza Brothers	3 00
CELERY.— Four roots of Paris Golden, best kept during the exhibition:	
First, A. F. Coolidge	5 00
Second, W. Warburton	4 00
Third, A. Nixon	3 00

Any other variety:	
First, A. Nixon, White Plume	5 00
ENDIVE.— Four specimens:	
First, E. C. Lewis	3 00
Second, C. F. Curtis	2 00
Third, A. E. Hartshorn	1 00
LETTUCE.— Four heads:	
First, A. F. Coolidge	3 00
Second, J. C. Stone	2 00
Third, E. M. Bruce	1 00
PARSLEY.— Two quarts:	
First, W. J. Clemson	2 00
Second, J. S. Bailey	1 00
HORSERADISH.— Six roots, present year's growth:	
First, H. R. Kinney	2 00
Second, A. Nixon	1 00
FIELD CORN.— Twenty-five ears, traced:	
First, B. P. Winch	3 00
Second, Elliott Moore	2 00
Third, Elliott Moore	1 00
SWEET CORN.— Twelve ears:	
First, A. E. Hartshorn	3 00
Second, E. C. Lewis	2 00
Third, A. Nixon	1 00
EGG PLANTS.— Four Round Purple:	
First, A. W. Crockford	3 00
Second, A. F. Coolidge	2 00
Third, Joseph Thorpe	1 00
TOMATOES.— Twelve Aristocrat:	
First, Joseph Thorpe	3 00
Second, Hon. Aaron Low	2 00
Third, Varnum Frost	1 00
May's Favorite:	
First, Hon. Aaron Low	3 00
Second, Varnum Frost	2 00
Third, Mrs. A. W. Spencer	1 00
Stone:	
First, Varnum Frost	3 00
Second, W. Warburton	2 00
Third, Warren Heustis & Son	1 00
Any other variety:	
First, Hon. Aaron Low, Maule's 1900	3 00
Second, Warren Heustis & Son, Hybrid	2 00
Third, Joseph Thorpe, Matchless	1 00
PEPPERS.— Twelve specimens of Squash:	
First, Hon. Aaron Low	3 00
Second, George W. Jameson	2 00
Third, A. F. Coolidge	1 00

Any other variety:

First, W. Warburton, Giant	3 00
Second, E. C. Lewis, Bull Nose	2 00
Third, A. Nixon, Ruby King	1 00

CULINARY HERBS.— Collection, named:

First, W. J. Clemson	5 00
Second, A. E. Hartshorn	4 00
Third, W. Warburton	3 00

Gratuities:—

Mrs. E. M. Gill, Beans	1 00
L. Cueci, Gourd	1 00
J. W. Burns, Collection of Potatoes	1 00
W. H. Burlin, Collection of Tomatoes	1 00
James Comley, Collection	5 00
Warren Heustis & Son, "	5 00
W. J. Clemson, "	3 00
W. Warburton, "	3 00
E. C. Lewis "	Silver Medal.

OCTOBER 20.

Gratuity:—

Mrs. E. M. Gill, Beans	1 00

EXHIBITION OF WINTER FRUITS AND VEGETABLES.

NOVEMBER 17.

PARSNIPS.— Twelve specimens:

First, A. Nixon	3 00
Second, W. Heustis & Son	2 00
Third, George D. Moore	1 00

SALSIFY.— Twelve specimens:

First, George D. Moore	3 00
Second, Warren Heustis & Son	2 00
Third, A. E. Hartshorn	1 00

CUCUMBERS.— Pair:

First, Francis Blake	3 00
Second, E. M. Bruce	2 00
Third, Mrs. John L. Gardner	1 00

CABBAGES.— Three Red, trimmed:

First, A. E. Hartshorn	3 00
Second, Hon. Aaron Low	2 00
Third, Hon. Aaron Low	1 00

Savoy:

First, A. E. Hartshorn	3 00
Second, A. Nixon	1 00

BRUSSELS SPROUTS.— Half-peck:	
First, A. E. Hartshorn	3 00
Second, A. E. Hartshorn	2 00
Third, E. S. Converse	1 00
CAULIFLOWERS.— Four specimens:	
First, C. M. Handley	3 00
Second, De Souza Brothers	2 00
Third, W. H. Teele	1 00
CELERY.— Four roots:	
First, A. Nixon	3 00
Second, Warren Heustis & Son	2 00
Third, W. Warburton	1 00
LETTUCE.— Four heads:	
First, J. C. Stone	3 00
Second, George D. Moore	2 00
Third, Varnum Frost	1 00
TOMATOES.— Twelve specimens, grown under glass:	
First, W. C. Winter, Essex	3 00
Second, W. C. Winter, Best of All	2 00
Third, W. C. Winter, May's	1 00

Gratuities:—

A. E Hartshorn,	Collection	4 00
E. C. Lewis,	"	2 00
W. Warburton,	"	2 00
A. Nixon;	"	2 00
George D. Moore,	"	2 00
Hon. Aaron Low,	"	1 00
Warren Heustis & Son,	"	1 00

WARREN HOWARD HEUSTIS, *Chairman*,
CEPHAS H. BRACKETT,
VARNUM FROST,
WALTER RUSSELL,
AARON LOW,
GEORGE D. MOORE,
JOSHUA C. STONE,
} *Committee on Vegetables.*

REPORT

OF THE

COMMITTEE ON GARDENS.

FOR THE YEAR 1900.

By PATRICK NORTON, CHAIRMAN.

Your Committee during the past season has been called upon to visit more places than ever before, and it would seem that the competition among the various exhibitors was as unflagging as ever. The unbiassed scrutiny by your Committee of the different methods adopted to attain a certain degree of excellence, is an incentive to parties having estates in charge to excel each other in all their undertakings, and is of the utmost importance to the landscape, the greenhouse, and the garden. The places visited will be treated in rotation in as brief a manner as possible, and at the end of this report we will append a list of our awards.

GEORGE D. MOORE'S LETTUCE HOUSE, ARLINGTON.

The first place for us to visit was George D. Moore's at Arlington, to inspect a house of lettuce. The greenhouse was two hundred and forty feet long by thirty-five feet wide, and contained fourteen thousand four hundred heads of lettuce, of remarkably even growth, very compact, and completely covering the ground. The plants were set eight inches apart all over the house, leaving paths on each side and one in the middle of the house. The lettuce would be in good condition to send to market in a week from the time of our visit.

Dr. Jabez Fisher's New Method of Growing Plants by Sub-Irrigation, Fitchburg.

On the 5th of April we visited Dr. Jabez Fisher, at Fitchburg, to inspect a new method of growing plants of all sorts, by sub-irrigation. This greenhouse was principally devoted to growing tomatoes. The house was one hundred and five feet long by eighteen and one-half feet wide, and contained two hundred and ninety-nine plants of "Sutton's Best of All," very heavily fruited. The first fruit to ripen was one hundred and twenty days from the planting of the seed. Dr. Fisher explains, in the letter which follows, his method of procedure.

Fitchburg, Mass., Aug. 1st., 1900.

To the Committee on Gardens, of the Massachusetts Horticultural Society:

The tomato house to which I have called your attention, is a double span, one hundred and five feet in length, and eighteen and one half feet wide, running north and south, and double glazed. The Committee may be interested to know that the house here described was built in 1860–61, and glazed with old time 10 x 12 glass. It still remains as originally built, and has grown forty-one annual crops of one kind or another. Hot water is the agent used in heating.

A single seed of "Sutton's Best of All" tomato was planted in a three and one-half inch pot at times from October 1st to November 10th, and the pots were set in shallow zinc pans in which was kept at all times about an inch of water. When the plants began to crowd one another they were transferred to their permanent position without disturbing the ball of roots.

The soil was a mixture of half decayed sods and horse manure in equal proportions, put together some months previously, and shovelled over several times during the summer. This soil was placed in bottomless boxes of sheet iron or wood, standing in zinc pans or on cement bottoms, so arranged that water could be supplied to the outsides of the boxes and be taken up by capillary attraction as the plants might require. The moisture was not kept up simply by the supply of water in this way, but actual standing water, averaging an inch in depth, was present during the entire life of the plants. Most of the boxes were twenty-four inches long, eighteen inches wide, and seven inches deep, thus

containing three square feet of surface, and each one held three plants, giving to each plant one square foot. The soil, made up of vegetable matter in large proportion, was placed in the boxes only four inches deep and without the slightest compacting, the object being to keep it as porous and spongy as possible, and no water was ever applied to the surface. The plants were trained to a single stem perpendicularly to the roof, and thence up the roof until they reached others, giving each one from seven to eight feet in length. Each third lateral was allowed to grow and produce a single cluster of fruit, thus doubling the number of clusters on the main stem. There were six rows of plants, and the plants were twenty-one inches apart in the row, the exact number being two hundred and ninety-nine. The first fruit was marketed March 2nd, and the last June 27th. At the time of your visit, which occurred April 5th, there were growing a few geraniums, callas, carnations, and coleuses, all under the same treatment, and although,—except in the case of the coleuses,—the temperature of the house was not suited to this class of plants, you saw their luxurious and healthy appearance.

Twice during the season a single inch of soil was applied as a top dressing, with a quantity of a complete fertilizer added. The whole settled so that the depth at the close did not exceed five inches, or seven hundred and twenty cubic inches to each plant, having a productive capacity of about fifteen pounds of fruit. I have learned that a larger quantity of soil is likely to produce an over-luxuriant growth that is detrimental to the setting of fruit, especially in the deficient sunshine of the short days of winter.

Blossoms were pollenized by the use of the camel's-hair brush and the padded stick alternately, until about the first of April, after which the brush was omitted. The white, healthy roots not only permeated the soil but extended freely into the clear water on all sides, thus showing that the conditions were congenial. The bottom inch of soil was, of course, under water at all times. The soil about that was never dry enough to be friable; on the contrary, it seemed to be so saturated with moisture as to be a mass of mud, and yet it contained sufficient atmospheric air to supply fully all the conditions required by plant life. The fruit was very solid and of fine color, without any show of disease.

JABEZ FISHER.

WILLIAM PROCTOR'S CUCUMBER HOUSE, FITCHBURG.

The third place visited was Mr. William Proctor's, at Fitchburg, on April 5th, to look at a house of cucumbers. The house was one hundred and five feet long by twenty-one feet wide, and had three rows of plants lengthwise of the house and two feet apart in the rows; the seed was planted January 15th. The house was very neat and clean, the plants were very healthy and extremely vigorous and well fruited, and Mr. Proctor was cutting a large quantity of fruit, of a larger and longer growth than the ordinary White Spine, which commanded a ready sale in the market, and made a very fine show. We append Mr. Proctor's letter, showing the splendid results of his method of growing cucumbers.

FITCHBURG, September, 25, 1900.

MR. PATRICK NORTON,

DEAR SIR:—Yours of the 18th is at hand and contents noted. I sowed my seed January 15th and transplanted several times to keep them back, my house not being ready. I always transplant three times, prick them out just as soon as they are thirty-six hours through the ground (in border on strong bottom heat), and twice in pots: first in four inch, then in six, getting strong plants in four weeks from sowing the seed.

I renew part of the soil six inches deep each year; it is composed of half sod and half fresh stable manure, mixed together during the summer. The temperature of the pile is high enough to kill all nematodes; there is no need of sterilizing, and I have never seen any root galls. I planted out the house and entered it for premium March 1st; cut the first cucumbers the 28th of March, and the last July 12th, there still being lots of cucumbers, but I had more than I could sell to good advantage, and I then finished painting my house, not having had time to do it before I set out my crop.

I keep the temperature between sixty and seventy,—not above seventy nor below sixty if I can help it, during the night, and eighty-five during the day (except cloudy days), when I let it rise only a little above the night temperature. I heat water from fifty-five to sixty degrees and use it in abundance, and use bees for pollinating.

I set out the plants on strong bottom heat, opening a trench ten

inches wide and twelve deep, putting in six inches solid of fresh horse manure; and use equal parts of nitrate of soda, sulphate of potash, and dissolved bone black after May first, a little at a time and often.

The house which I entered for cucumbers is one hundred and thirty-five feet long, and twenty feet wide. It contained one hundred and twenty plants (three rows). I have cut not less than eighteen bushels per week since you were here until the 15th of July, two hundred and ninety-eight bushels in all.

You know there is only one secret in business: eternal vigilance,—the man who attends closest generally gets the best results. Yours very truly,

WILLIAM PROCTOR.

M. A. PATTEN'S CARNATION HOUSE, TEWKSBURY.

On April 11th we visited the large greenhouse plant of M. A. Patten, at Tewksbury, to inspect a house of carnations. The house was two hundred and fifty feet long by twenty-one feet wide, built but lately by Lord & Burnham. The house was very neat and clean, and the plants were on benches, and very vigorous and healthy. The stems were nearly two feet long and the flowers very large and highly colored. The numerous kinds included Mme. Joost, White Cloud, G. H. Crane, Mrs. Bradt, Flora Hill, Melba, Maud Adams, and a large number of seedlings.

ESTATE OF C. H. TENNEY, METHUEN.

On the 8th of June your Committee visited the elegant estate of C. H. Tenney, at Methuen, which is entered for the H. H. Hunnewell Triennial Premium. The whole estate, containing eighty acres of land, was in the most perfect order, situated on the top of an uneven hill, splendidly planted with the most expensive trees and shrubs in a judicious manner, and it presented a very beautiful appearance. The coniferæ were of generous size, and planted in such a way as to show each as a specimen tree. The new growth on these enhanced their beauty, and everybody was enthusiastic over their elegance. The groups of large Japan maples were another good feature in the landscape; so also the large beds of rhododendrons, fully in flower, and interspersed with azaleas. The estate was replete with everything that good taste could utilize to make it a sumptuous summer home.

Greycourt, the Estate of C. H. Tenney, Methuen.

Mrs. David Nevins's Estate, Methuen.

On June 20th we visited Mrs. David Nevins, at Methuen, where we were received in a new house adjoining the Memorial Library grounds. It is the intention of Mrs. Nevins to remove this house and put the then vacant land into the Library domain, thereby enlarging those surroundings. The old homestead, on the opposite side of the street, was being overhauled and repaired, and when transformed would be re-occupied later in the season. The generous hospitality of Mrs. Nevins was repeated on this occasion just the same as was always exercised by the late Mr. Nevins whenever we visited their elegant estate at South Framingham. It was an enjoyable day, long to be remembered.

Warren H. Heustis's Strawberry Garden, Belmont.

The seventh place visited was that of Warren H. Heustis, at Belmont, on the 25th of June, to inspect and sample strawberries. The two parcels consisted of about a half-acre each. The first parcel was the Marshall, and it was wonderfully well fruited with exceedingly large, highly colored berries in very fine condition. Expert growers from Arlington made the statement that it was the best half-acre of strawberries they ever saw, and this was endorsed by your Committee. The other bed was made up of a number of varieties, planted with a view to test their quality and productiveness as compared with the Marshall and Belmont. Mr. Heustis's vegetable garden was in fine condition, and he was sending to market daily very large loads of the choicest kinds, which commanded a ready sale at good prices.

O. B. Hadwen's Estate, Worcester

On July 19th we visited the estate of O. B. Hadwen, at Worcester. The farm consists of about sixty acres of land, and is mostly in grass and fruit. A great many of the apple trees were grown from seed planted by him many years ago. Nearly all the other trees were set out by him and have attained great size; some of them we measured and found them from nine to ten feet in circumference. Many of the trees and shrubs were of unusual rarity and beauty—very choice specimens, not often seen on any place. The planting was not to be com-

mended, as some of the rare trees and shrubs had not room enough to permit them to develop into handsome specimens. In consequence the grounds had rather a crowded appearance, which might have been obviated by giving each shrub or tree plenty of room to develop.

E. S. Converse's Vinery, Malden.

We visited on July 26th the estate of E. S. Converse, at Malden, to inspect a vinery which consisted of a span roof house containing sixteen vines averaging fourteen bunches of grapes to the vine. The fruit was in very large bunches, highly colored, with a fine bloom, and of the first quality. There were several other houses of grapes in all stages of growth and ripening, but our attention was directed to that above described, for the fruit was in the best condition for the table. The place was kept by Mr. D. F. Roy, the gardener, in fine condition, and the judicious arrangement of greenhouse plants about the grounds gave it a sumptuous appearance seldom seen on suburban estates.

Arthur F. Estabrook's Grounds, Beach Bluff.

The tenth visit was to the summer residence of A. F. Estabrook, at Beach Bluff, on August 15th. The Committee was very much pleased with Barberry Lodge, and with the work performed by Mr. Barker, the gardener. The grounds were in fine condition, and the various specimens of "bedding out" were a credit to the gardener. The border of sweet alyssum around the house was very fine and finished off the background of trailing and other plants most completely. The hospitality of Mr. Estabrook was only equalled by the fine appearance of his estate.

The Oliver Ames Estate, North Easton.

On September 7th the Committee visited Mr. Oakes Ames, at North Easton. This estate is entered for the Hunnewell Triennial Premium, and this is the second year of entry. It presented a much finer appearance than last year. The lily ponds were full of water and all the aquatics were in splendid bloom. The greenhouses were full of magnificent plants, and Mr. Ames's experience in crossing species and raising seedlings seemed to be very

The Oliver Ames Estate, North Easton.

successful. It is a great pleasure to visit a place where the owner is so deeply interested in everything pertaining to the beautifying of nature.

Lothrop & Higgins's Dahlia Gardens, East Bridgewater.

The twelfth visit this year was made to the dahlia gardens of Lothrop & Higgins, at East Bridgewater. These consisted of four acres, where over four hundred kinds of the best varieties procurable were grown. The display was very fine and well worthy of the visit. Generous culture and dwarf plants, requiring no stakes, were prominent features to be commended. Some of the cactus varieties were remarkable both for color and shape. One variety was grown more particularly for its beautiful fern-like foliage, for cutting to place with the flowers of the more formal varieties.

Col. Frederick Mason's Vegetable Garden, Taunton.

September 13th a visit was made to Taunton to inspect the vegetable garden of Col. Frederick Mason. The gardener, Mr. E. C. Lewis, complained of a very dry season and that the crops suffered in consequence, but your Committee did not discover any deficiency in moisture on the whole farm, every crop being in a high state of productiveness. We noticed that he uses a large quantity of ashes and nitrate of soda, and these may, in a measure, account for the unusual good quality of his crops. Thorough cultivation was another feature to be commended. On the whole farm we saw no weeds, for the farmer told us that it was easier to grow crops of vegetables than of weeds. We were much pleased with our visit to this place.

Col. Charles Pfaff's Chrysanthemum House, South Framingham.

The fourteenth visit was to the elegant estate of Col. Charles Pfaff, at South Framingham, to inspect a house of chrysanthemums grown on benches. The house was eighty-five feet long by twenty-one feet wide, and contained six hundred plants in seventy-five varieties, and it presented a splendid appearance.

The plants were grown to one flower each, were of very sturdy growth, well covered with massive foliage from the bloom down to the earth in the bench, and crowned with enormous flowers. In fact it was a splendid sight to behold, and reflected great credit on the gardener, Mr. George Melvin, for his skill in growing the "Golden Queen of Autumn."

Mrs. A. W. Spencer's Chrysanthemum House, South Framingham.

On November 1st your Committee visited the estate of Mrs. A. W. Spencer to inspect a house of Chrysanthemums grown on benches. The house contained eight hundred plants of sixty-two varieties and this was the first crop of any kind ever grown in it. Mr. Alexander McKay, gardener to the late David Nevins, has charge of the place, and from the superb exhibition he made we know that his right hand has not forgotten its cunning in growing this superb flower.

We are glad to know that Mrs. Spencer has secured the services of so good an "all round" man in the cultivation of her estate.

Mrs. B. P. Cheney's Chrysanthemum House, Wellesley.

On November 2nd we visited the estate of Mrs. B. P. Cheney, at Wellesley, to inspect a house of chrysanthemums arranged for effect with other decorative plants. This house is particularly adapted for such an arrangement, and the gardener, John Barr, has the good taste to take advantage of the situation to make the house "a thing of beauty" and the recollection of it "a joy forever" to everyone who saw it. The plants were grand, averaging fully six feet in diameter, well flowered and extremely well trained. The arrangement of the house with regard to colors was very fine, particularly so as plenty of decorative foliage plants were freely used to enhance the beautiful display of color in the chrysanthemums. The house was seventy-five feet long by twenty-five feet wide, and twenty-eight plants filled the house. We append the gardener's report.

South Natick, November 23rd, 1900.

Mr. Patrick Norton.

Dear Sir:—We propagated sixty-five plants in November, 1899, in forty-five varieties; as soon as rooted, potted into two and

a half inch pots, and shifted along into four inch, and so on as they required it. About the first of June they got the final shift into twelve inch pots. During the summer we discarded such varieties as did not seem suitable for that way of growing; we finished twenty-eight plants and they filled one house twenty feet by seventy. I pinch every second leaf from the time they are rooted till the middle of July; it must be done regularly to get a well balanced specimen. In potting I use a mixture of sod, loam, old cow manure, and a good share of bone flour; we allow the flowering pots to be well filled with roots before we start feeding, and for the last two years I have used Imperial Liquid Food for that purpose entirely, applying it twice a week and increasing the strength as the plants required it; as the plants commence to show color I gradually withhold it. Hoping you are well,

Yours truly,

JOHN BARR.

List of names of specimens:

Arethusa,
Black Hawk,
Dr. Hope,
Edith Smith,
Georgiana Pitcher,
Georgienne Bramhall,
Golden Trophy,
Kate Broomhead,
Lady Hanham,
Lady Isabel,
Louis Boehmer (two plants),
Marion Henderson,
Mongolian Prince,
Mrs. E. B. Freeman,
Mrs. F. A. Constable,
Mrs. H. Weeks,
Mrs. J. G. Breer,
Mrs. J. Lewis,
Mrs. N. Molineaux,
Mutual Friend,
Peter Kay,
Phoebus,
Red Warrior,
Savannah,
Shilowa,
Silver Cloud,
The Bard.

EDWARD HATCH'S ESTATE, WENHAM.

On the third of November the Committee visited "The Windmill," the hospitable abode of Edward Hatch, Esq., situated on Lake Wenham. Mr. Hatch's aim is so to beautify this place by the judicious planting of trees and shrubs as to make it pleasant and agreeable to his numerous friends when they visit him in his

own domain. The house is prettily placed on an eminence overlooking Lake Wenham, one of the most picturesque bodies of water in this section of the country, where sailing and fishing are enjoyed by all the lovers of those sports. Thirty-five new trees were planted this Fall, and the advice of this Committee will be taken in all future operations.

Edmund M. Wood & Co.'s Waban Rose Houses, Natick.

The last visit made this year was on the 15th. of November to the Waban rose houses of Edmund M. Wood & Co., at Natick. Our object was to inspect a house of roses. The house was three hundred and fifty-five feet long by twenty feet wide, and contained about twenty-five hundred plants, which were planted in solid beds on June 29th last. The plants were very vigorous, remarkably healthy, and splendidly flowered, and consisted of Brides and Bridesmaids with very large well finished blooms. The other houses were in the same good condition, and reflected great credit on Mr. Alexander Montgomery, who has charge of the whole plant. Two new houses, erected this summer, each seven hundred feet long, were planted to American Beauty and Liberty roses, and were well worth looking at, as they are the longest houses ever visited by your Committee.

The prizes awarded this year are as follows:

Special Prize from the John A. Lowell Fund:

For the best House of Chrysanthemums grown on benches:	
First, Mrs. A. W. Spencer	$30 00

Society's Prizes.

For the best House of Roses:	
First, E. M. Wood & Co.	30 00
For the best House of Carnations:	
First, M. A. Patten	30 00
For the best House of Foreign Grapes:	
First, E. S. Converse	30 00
For the best Strawberry Garden:	
First, W. H. Heustis	30 00
For the best House of Cucumbers:	
First, William Proctor	30 00

For the best House of Lettuce:	
First, George D. Moore	30 00
For the best Vegetable Garden:	
First, W. H. Heustis	30 00

Gratuities.

Mrs. B. P. Cheney, House of Chrysanthemums grown on benches	20 00
Lothrop & Higgins, Dahlia Garden	25 00
Dr. Jabez Fisher, House of Tomatoes, grown by sub-irrigation .	30 00
Arthur F. Estabrook, Estate	25 00
O. B Hadwen, "	25 00
Edward Hatch, "	25 00
Mrs. David Nevins, "	25 00
Col. Charles Pfaff, Chrysanthemums on benches . .	Silver Gilt Medal.
Mrs. B. P. Cheney, House of Chrysanthemums in pots, arranged for effect	Silver Gilt Medal.
Col. Frederick Mason, Vegetable Garden . . .	Silver Gilt Medal.

Respectfully submitted,

PATRICK NORTON, Boston, *Chairman*,
WILLIAM WALLACE LUNT,
J. WOODWARD MANNING,
E. W. WOOD,
WARREN HOWARD HEUSTIS,
JOSEPH H. WOODFORD,
JACKSON T. DAWSON,
HENRY W. WILSON,
} *Committee on Gardens.*

REPORT

OF THE

Committee on School Gardens and Children's Herbariums.

FOR THE YEAR 1900.

By HENRY LINCOLN CLAPP, CHAIRMAN.

In the spring of 1900 a kitchen garden was established on the grounds of the George Putnam School, Roxbury, for reasons that have long been understood and appreciated by various authorities, educational, horticultural, and agricultural, in Europe.

No influence, encouragement, or financial aid of any society, or coterie of interested neighbors was concerned in its establishment. The first suggestion of using the land for a garden came from the Superintendent of Schools, Mr. E. P. Seaver. The model for planning and managing it came from Germany. There are no models of complete school gardens in this country.

The local preacher, Rev. Seth Carey, observed the children at work in the garden, back of his residence, and came to the conclusion that the enterprise contained a lesson important enough to warrant him in devoting a part of his Sunday sermon to its presentation. Garden work would keep children off the streets, cultivate habits of industry and respect for other people's gardens, improve their observational powers, give them a love for plant growth, incline them to better manners and morals, and turn their attention towards the blessings of outdoor life as an offset to the strong current toward shop life.

FIG. 1.

Straightening and planting the beds.

A piece of rough, grassy land, four rods square, was ploughed by a friend free of charge; the director of the garden paid for manuring it, eighty-four pupils made eighty-four beds, each ten feet long and three and a half feet wide, and surrounded them on all sides with walks fourteen inches wide, and bought tools, seeds, and plants for carrying out their work.

The size of the beds is about the same as that of the beds given to school children in Germany. The width of a bed is such that the young gardener can easily reach every part of it with his hand.

The formation of the beds according to lines carefully determined was a good lesson in simple plotting; but owing to the roughness of the land many measurements had to be repeated before the beds and paths could be exactly located.

Directions for planting different kinds of seeds were given to the pupils in their class rooms. Some seeds were to be planted in hills, some in drills, some barely covered with earth as in the case of very fine seeds, some with more earth as in the case of corn, beans, and potatoes. Nevertheless a good many mistakes were made in planting, as shown later when the young plants came up.

FIG. 2.

Weeding and watering.

The carrots, parsnips, beets, and cabbage and lettuce plants were very thick, and the necessity for transplanting was plain when the matted plants refused to increase in size, while those that came from single scattered seeds increased in size rapidly.

The various modes of plant growth were very interesting to the children. Since they worked in the garden only once a week, on Monday in the afternoon, some changes in the plants during the week excited surprise. The appearance of the bean plants produced consternation. There was a suspicion which almost amounted to a certainty that some one had been pulling up the beans and setting them out again. A week before they were certainly under the ground and now they were above it. The children's wrath was appeased when they were told that that was the bean's way of growing. The skin of the onion seed at the end of the grass-like shoot, the tap roots of carrots, parsnips, etc., the strong spreading roots of corn plants, and many other variations in plant growth were carefully observed.

The transplanting was attended with many failures on account of the great disturbance of the roots of the plants. One girl jerked up her bean plants with her right hand and transferred them to

FIG. 3.

Visit of the Normal School pupils.

her left till she had a large bunch and then put them into the earth as if they had been so many lifeless sticks. Although she deluged them with water, she wondered why they did not grow. They simply turned yellow and vanished. The sowing and the reaping and the care between were full of lessons of failure and success, of observation and comparison, which were of great educational value. The children could hardly wait for the garden day to come. The sun was hot, the weeds made excellent progress during the week, and the work was often hard for inexperienced workers; but interest never seemed to flag.

Flowering plants as well as vegetables were planted in some beds, and both kinds were taken home a number of times during the summer. Raw peanuts were planted and the production of new peanuts was a constant source of interest to the children. Vegetable roots, such as beets, various kinds of turnips, carrots, etc., were planted and allowed to flower and go to seed. The big roots dwindled away in proportion as they put their life into the part of the plant above ground for the production of seed.

The pupils of the Boston Normal School visited the garden three times during the season to observe the children at work.

The children who left the city during the long summer vacation found their beds overgrown with weeds when they returned at the opening of the school. About half the beds had to be reassigned on account of promotions from the seventh grade, the children

Fig. 4.

Weeds when the school opened, Sept. 12.

who have gardens being confined to that grade. Weeding was the main business for a time; then the beds were put in shape and planted with bulbs — tulips, crocuses, hyacinths, etc., which the children bought. So next spring they will have flowers a good deal earlier than they did last spring.

Among all the schemes for manual training in this country, there is not one that is carried on by means of outdoor work; all rely on indoor work. In Europe the method is quite different. It certainly has a wider range and seems more suitable for children, taking the year through. During the warm season manual training is carried on out of doors in school gardens; but during the cold season Sloyd, carving, and other forms of indoor work are carried on. In this way all pupils have fine opportunities for sharpening their powers of observation by studying plants under competent direction. The school children in this country do not have that advantage.

The Committee wish to direct the attention of educators, horticulturists, and agriculturists to the great educational, æsthetic, and economic value of school garden work by means of this report, pictures, description, statistics, and all, and to suggest the great

FIG. 5.

Weeding contest between boys and girls.

opportunity presented to a society like this, for instance, to encourage and extend such work, of which so much is done in Europe and so little in this country. It is worth while to consider seriously what educators, horticulturists, and agriculturists in Europe think of school gardens, and what they have done to put their ideas into practice. If the consideration should result in the Society's taking an active part in establishing gardens on school premises, and should enlist the aid of the Massachusetts State Board of Education to the same end, the cause of education, horticulture, and agriculture would be advanced, if we may judge from what Europeans engaged in similar occupations have done.

Austria-Hungary, the most favored place for school gardens, has eighteen thousand; Sweden in 1899 had four thousand six hundred and seventy; all public elementary schools in Belgium have gardens, each at least thirty-nine and one-half square rods in area; model school gardens are connected with five normal schools and many elementary schools in Switzerland; model school gardens are connected with the normal schools in six cities of France, and no plan of a school building in the country to which the State contributes is accepted unless a garden is attached;

FIG. 6.

Bulb planting, Nov. 15.

middle and southern Russia have many school gardens, those in one province alone occupying two hundred and ninety-six and one half acres of land; in Germany many a large city has a central school garden which supplies thousands of cuttings for the use of schools; Magdeburg has such a garden containing nearly sixty-two acres, Leipsic three acres, Breslau, Mannheim, Dortmund, and Cologne, each five acres, and other cities, far too numerous to mention, have gardens of less area.

The statements made concerning the Massachusetts Horticultural Society, in 1829, seventy years ago, are just as applicable now concerning the establishment of school gardens. Judge Buel of Albany wrote a letter to the editor of the "New England Farmer" and in it said: "There is more talent in Boston and vicinity for such an association than in any other place in the United States." In the "New England Farmer" of January 9, 1829, a letter was published, the writer of which said "Whatever has a tendency to promote this honorable, useful, and independent branch of domestic industry, should be fostered and regarded. . . .

The citizens of Massachusetts have never been backward in promoting any object of public utility; and it is believed that all that is now wanting to give an impulse to the plan here suggested is to present the subject to the consideration of your readers. New York, Philadelphia, and some other of our sister cities have preceded us in the good work. Let us go and do likewise." To make these statements perfectly applicable to the establishment of school gardens we have simply to change the last statement thus: Most European countries have preceded us in the good work from twenty to forty years. Let us follow their example.

MEDFORD SCHOOL GARDENS.

The gardens at the Swan and Curtis Schools have been kept up to their usual excellence during the past year, and have furnished the classes with much of the material for their nature lessons. As the pupils of these schools are all of primary grades (grades I to III) it has not been considered wise to introduce any greater variety of plants than are now in the garden. The care and study of these are sufficient for such young people, the ages ranging from five to nine years.

The Brooks School made a beginning on its garden the past year, and the pupils were enthusiastic to get it well stocked with wild flowers. As this was the first season, it is not wise to attempt to give a list of the specimens introduced, as many will not survive the winter. A large number of Asters and Goldenrods and several Lactucas have evidently found a permanent home in this garden, having been planted in the fall of 1899. The garden runs the whole length of the back line of the school lot, which is upwards of three hundred feet, and each schoolroom has its allotted portion in which to cultivate the representatives of the families of plants that are included in the nature study of the grade. The fern garden was begun in the season of 1899, and has now a good list of species. The following have been successfully established:

Polypodium vulgare.
Adiantum pedatum.
Pteris aquilina.
Asplenium Trichomanes (in schoolroom).
Asplenium bulbiferum (in schoolroom).
" *thelypteroides.*
" *Felix-fœmina.*

Camptosorus rhizophyllus (in schoolroom).
Phegopteris polypodiodes.
" *hexagonoptera.*
" *Dryopteris.*
Aspidium Noveboracense.
" *spinulosum* var. *intermedium.*
" *cristatum.*
" " var. *Goldianum.*
Aspidium marginale.
" *acrostichoides.*
Cystopteris bulbifera.
" *fragilis.*
Onoclea sensibilis.
" *Struthiopteris.*
Woodsia Ilvensis.
Osmunda regalis.
" *Claytoniana.*
" *cinnamomea.*
Botrychium ternatum.

SCHOOL GARDEN AT BATH, MAINE.

This garden which was started in 1896, has now forty-three flowering plants and fifteen ferns. The following plants were added during the season of 1900:

Coptis trifolia.
Viola pedata.
Amphicarpæa monoica.
Streptopus roseus.

Viola Canadensis, a small root in 1896, has borne unusually large flowers on very long stems, and has spread so that it now covers a space four and one half feet by five feet.

Aster longifolius has produced many pink flowers of large size, some of them an inch and a half in diameter. The Solomon's Seal has also made wonderful growth since it was put in, in 1897.

Solidago juncea formed this year a very beautiful, graceful clump, nearly twice the size of the plant when put in the year before.

Some of the girls studied the flowers and ferns as they came forward in the spring, drawing them in the different stages, noting dates and characteristics.

LOUISVILLE, KY., SCHOOL GARDEN.

REPORT BY EMILIE YUNKER.

LOUISVILLE NORMAL SCHOOL.

We started a flower garden on a small scale in our school yard last year. But we secured a larger garden space in a neighbor's back yard in the vicinity of our school, through the kindness of Joe Mitchell Lavielle's mother.

Eleven boys and girls, averaging seven and a half years of age, formed the Gardeners' Club. They planted such rapid growing plants as white hyacinth bean, purple flowering bean, balsam, zinnia, cotton, radishes, carrots, beets, tomatoes, lettuce, and popcorn, of which we popped a grape basket full one day in the fall, in Mrs. Lavielle's back yard to which I have referred. The children received much interest and useful instruction from the work which they did, and we have been promised twice as much space this coming year.

CONCERNING SCHOOL GARDENS ELSEWHERE.

Mr. H. H. Longsdorf of Camp Hill, Pa., has been commissioned to prepare a bulletin on "Consolidation of Rural Schools in Pennsylvania." Fortunately he learned of the school garden movement under the auspices of the Society, wrote me to have a halftone cut of children at work in a school garden made for him to illustrate his bulletin, and sent a check for two dollars and a half to pay the cost of the cut. He probably received the cut at the end of the third day after his order was received.

In his letter he says: "I was captivated by the idea of the school garden feature and thought it applied to conditions in this State. Strange it has never been experimented upon, or even mentioned, where land is so abundant. We intend to work up the school garden in this State. You will see I have copiously quoted from your article (Popular Science Monthly, Feb., 1898), and acknowledged my indebtedness to you in my letter of transmittal to the Secretary of Agriculture of this state."

Mr. W. H. Moulton, Secretary of the Industrial Committee of the Cleveland, Ohio, Chamber of Commerce, is much interested in cultivating in children a love for plants, and in one of his letters says: "In regard to our work here I would state that some money has been contributed to experiment with one of our down-town school grounds, and we shall endeavor to make during the coming summer all that we can out of it.

Last year forty thousand packages of flower seeds were distributed to the school children, who paid for them one cent each. This year, from time to time, we shall address the school children on this subject, and wish to get as complete a list of slides as possible—slides of school grounds, scholars at work, vines, shrubbery,

and flowers. We wish to be advised as to whether we can obtain the photographs of which you speak, from which we can have slides made, and if so, we will remit for them on receipt of your advice as to their cost. We shall be pleased to send you the report on the distribution of seeds last year as soon as it is received from the printer."

CHILDREN'S HERBARIUMS.

Concerning the exhibition of children's herbariums a person was heard to ask, "What's the use of studying them dried things?" Evidently more light is needed in respect to the connection of herbarium work with the proper work of this Society or any other horticultural society. The light should come from this library of ten thousand volumes, more or less. Undoubtedly there are persons whom this library cannot illuminate; but a suggestion may do some good. More than half the authors of these books studied "them dried things," and thereby were enabled to write their books. The names of Linnæus, De Candolle, Jacob Bigelow, and Asa Gray will live when our names are forgotten. Professors Goodale, Robinson, Thaxter, and Fernald of Harvard College can tell the use of studying "them dried things". Walter Deane has collected thirty-five thousand of "them dried things," and in doing it has won a national reputation as a botanist. Thousands of professors of botany in colleges and scientific societies all over the world have studied "them dried things," and by so doing have obtained education, reputation, happiness, and a good living. No one can expect to get more by raising cabbages and onions, apples and pears, roses and chrysanthemums.

The good thing about the whole work is that "them dried things" are first-hand evidence that they have been and will be studied as living things. The influence goes through the life. It is probable that children who become interested in plants, living or dried, will continue to study them in adult life.

Arthur C. Faxon, who exhibited plants in this hall up to the age limit, studied rare plants last summer in Randolph, N. H. Miss Lucy D. Ellis, who won the first Davenport prize of fifty native ferns in 1897, is now a pupil in the Boston Normal School, preparing to be a teacher. She has been invited to give a talk on ferns before the teachers and pupils of the Normal School. John

Murdoch, Jr., who had an unusually large collection at the last exhibition, found a very rare plant, *Cycloloma platyphyllum*, in Orleans, Mass., last summer, an account of which was published in "Rhodora" by the New England Botanical Club. Its ordinary range is from Manitoba westward and southward.

A new and especially interesting feature of the exhibition was found in a large collection of strange seeds gathered by Mrs. H.L. T. Wolcott on her journeys to the South, the Bermudas, California, the Sandwich Islands, and other places. Some were remarkable in shape, others in color, and all were especially interesting to those who knew by actual experience how and where they grew. Most of the names would give the reader, though acquainted with the flora of all New England, no idea of value.

However, there were in the collection seeds of many trees and plants whose names are not infrequently mentioned in school geographies and books of travel, such as acacia (six kinds), banyan, Barbadoes cherry, *Bixa Orellana* (dye called *annotto* is made from the seeds and used in coloring butter and cheese), sweet and sour sop, cassia (seeds packed in like a roll of lozenges and partitions of pods used in preparing chewing tobacco), calabash (used for bowls), eucalyptus of several kinds (from Australia), india rubber, litchi (commonly given away by Chinese laundrymen), mesquite (from Colorado desert), mango (delicious fruit), pomegranate, persimmon, royal palm, Madagascar palm, sugar palm, betel palm, date palm, jaggery palm, morning-glory (from Africa, the seeds when steeped in water are an antidote for snake bites), pecan, guava (excellent fruit, used for jelly), lobed oak (three thousand feet up Mount Lowe), ginkgo (Japan), water chestnut (from China, now in Concord River), and tamarind (used for invalids).

All day there was an interested company looking at the collection and listening to Mrs. Wolcott's desription of the seeds and the trees and plants which produced them.

PRIZES AND GRATUITIES AWARDED FOR SCHOOL GARDENS AND CHILDREN'S HERBARIUMS.

SCHOOL GARDENS.

George Putnam School, Roxbury, first prize	$15 00
High School, Bath, Maine, second prize	12 00

CHILDREN'S HERBARIUMS.

FLOWERING PLANTS.— For fifty specimens:

First prize, Edward L. Morse	2 00
Second, C. Davis Swain	1 50

Gratuities:—

John Murdoch, Jr., for one hundred and ninety-nine additions	5 00
Joseph Murdoch, for one hundred and forty-two additions	4 00
L. B. McLaughlin, for one hundred and twenty-five additions	2 50
Richard Murdoch, for one hundred additions	3 00
Ruth Robinson, for sixty-four additions	3 25
Helen Robinson, for fifty additions	3 00
Robert D. Morse, for fifty additions	2 50
Philip Morse, for fifty additions	2 50
Winthrop Swain, for fifty additions	2 00
Marion L. French, for forty-one additions	1 75
Olive L. French, for thirty-eight additions	2 75
Bessie R. Parmenter, for thirty-four additions	2 25

FERNS.— For thirty specimens:

First prize, Cristine Dudley Clapp	5 00
Second, Edith A. Cumberland	4 00
For twenty specimens:	
First prize, Bertha Wood	3 50
Second, Maud L. Barnes	3 00
For fifteen specimens:	
Second prize, Joseph Murdoch	3 00
For ten specimens:	
First prize, Edith M. Butcher	2 00
Second, Grace M. H. Stack	1 00
For five specimens:	
First prize, Bessie R. Parmenter	75
Second, Henry Rothenburg	50

Gratuity:—

John Murdoch, Jr., for six additions	50

SEDGES.

Gratuities:—

John Murdoch, Jr., for twenty-five additions	2 00
Olive L. French, for ten additions	1 25

GRASSES.

Gratuities:

John Murdoch, Jr., for twenty additions	2 00
John Murdoch, Jr., for miscellaneous collections	50

SCHOOL HERBARIUMS.

For the best Herbarium of seven classes:	
Second prize, Franklin Primary School, Holbrook	6 00
Total for Gardens and Herbariums	$100 00

The amount of money appropriated by the Society for the use of of the Committee was:

For Prizes and Gratuities	$125 00		
For Current Expenses	75 00		
		200 00	
Received from sales of paper		16 55	
			$216 55
Awarded for School Gardens		$27 00	
Awarded for Herbariums		73 00	
Printing		21 00	
Paper		15 92	
Advertising		5 60	
Expressage, posters, stamping, etc.		10 00	
Postage, wrappers, etc.		1 95	
Total Expense			154 47
Balance unexpended			$62 08

HENRY L. CLAPP, *Chairman*, Roxbury,
MISS KATHARINE W. HUSTON, Roxbury,
WILLIAM P. RICH, Chelsea,
CHARLES W. JENKS, Bedford,
MRS. H. L. T. WOLCOTT, Dedham,
HENRY S. ADAMS, Dorchester,
W. E. C. RICH, *Secretary*,
99 Moreland Street, Roxbury, Mass.

Committee on School Gardens and Children's Herbariums.

REPORT

OF THE

COMMITTEE ON NATIVE PLANTS.

By Henry Lincoln Clapp.

The members of the Committee on Native Plants have no sympathy with the struggle for money prizes, but aim simply to do good service to others, especially children, that in itself being a sufficient reward. No member of the Committee has ever profited one cent in money by ten years' work, or less, in interesting children in native plants and the growth of plants in general. Money won by gardens has been spent on the same gardens, the benefits of which have been distributed among many children. Money has been awarded for herbariums as economically as if it had been the personal property of the Committee.

The Committee on School Gardens and Children's Herbariums took up the work concerning the exhibition of native plants with some reluctance, because it was not children's work, for which the Committee was brought into being, and the members, who had for years been responsible for the work and had done it, were teachers who invariably left the state during the long summer vacations, and who could not reasonably be expected to judge exhibits of native plants Saturdays. However, with the understanding that the educational, and not the money side of the work should be kept uppermost, the Committee as a whole became responsible for the work, nearly all of which had been done in an excellent manner by the two members who have been appointed recently and could judge the exhibits, Messrs. Jenks and Adams.

That the exhibitors might have in view some points which make for an attractive and instructive display of native plants, the Committee have recommended the use of score cards including the following points and their relative value:

1. (25 points) Completeness of specimens (typical leaves of asters, cleistogamous flowers, radical leaves, and other characteristic parts).

2. (25 points) Educational value (species of the same genus, varieties of the same species, etc., for the purpose of comparison; a number of pyrolas, roses, viburnums and other flowers blossoming at the same time).

3. (20 points) Rarity of specimens.

4. (10 points) Freshness (not wilted or dried).

5. (10 points) Neatness (no dead leaves, cobwebs, slime, straggling branches, etc.).

6. (10 points) Color arrangement (avoid blue and purple, scarlet and lake reds, etc., in juxtaposition).

More than three specimens of a single species will disqualify the bottle in proportion to the excess. This restriction seems necessary for the preservation of rare wild flowers, which are becoming rarer, large masses of which have been used to make a fine display. Three typical specimens tell as much as a larger number.

The exhibits of native plants were fine all through the season and attracted the attention of botanists and those who wish to know wild flowers. The number of exhibitors also made the native plant exhibitions notable for their size and quality. Some of the collections which did not receive prizes were well worthy of them; but only three prizes were offered and won, and all meritorious collections, except the best three, received nothing. It is hoped that the new distribution of the money for premiums will prove more serviceable. Five prizes instead of three will enable more exhibitors to win a prize. It is hoped that the diminished money value of the premiums will not impair the character of the exhibitions. If it does, the inference will be that the desire for money is greater than the desire to interest and instruct the many visitors that are always seen studying the native plants on exhibition.

PRIZES AND GRATUITIES AWARDED FOR NATIVE PLANTS.

1900.

MAY 5.

NATIVE PLANTS.—Collection of thirty bottles of named species and varieties, one bottle of each:

First, Miss Alice L. Grinnell	$8 00
Second, Mrs. W. S. Eager	6 00
Third, Miss Genevieve Doran	4 00

MAY 12.

Gratuity:—

Miss Alice L. Grinnell	1 00

MAY 19.

Gratuity:—

Misses Eleanor A. and Mollie S. Doran	1 00

MAY 26.

Gratuity:—

Miss Alice L. Grinnell	2 00

JUNE 2.

Gratuity:—

Miss Genevieve Doran	2 00

JUNE 12 AND 13, (postponed from JUNE 6 AND 7).

NATIVE PLANTS.—Collection of thirty bottles of named species and varieties, one bottle of each:

First, Miss Alice L. Grinnell	8 00
Second, Mrs. W. S. Eager	6 00
Third, Misses Eleanor A. and Mollie S. Doran	4 00

JUNE 16.

CULTIVATED NATIVE PLANTS.— Collection of species and varieties not common to cultivation:

First, Miss Edith Noyes	4 00
Second, Arthur Clark	3 00

JUNE 23.

Gratuity:—

Miss Alice L. Grinnell	2 00

JUNE 30.

Gratuity:—

Miss Edith Noyes	1 00

JULY 7.

NATIVE PLANTS.— Collection not exceeding forty bottles of named species and varieties, one bottle of each:

First, Miss Alice L. Grinnell	8 00
Second, Miss Edith Noyes	6 00
Third, Carl Blomberg	4 00

JULY 14.

NATIVE FERNS.— Collection of named species and varieties:

First, Carl Blomberg	6 00
Second, Miss Alice L. Grinnell	5 00
Third, Chester C. Kingman	4 00

CULTIVATED NATIVE PLANTS.—Collection of species and varieties not common to cultivation:

First, Miss Edith Noyes	4 00
Second, Arthur Clark	3 00

JULY 21.

Gratuity:—

Misses Eleanor A. and Mollie S. Doran	2 00

JULY 28.

NATIVE PLANTS.— Collection not exceeding forty bottles of named species and varieties, one bottle of each:

First, Carl Blomberg	8 00
Second, Miss Alice L. Grinnell	6 00
Third, Mrs. W. S. Eager	4 00

AUGUST 4.

Gratuities:—

Miss Alice L. Grinnell	3 00
Miss Genevieve Doran	1 00

AUGUST 11.

CULTIVATED NATIVE PLANTS.—Collection of species and varieties not common to cultivation:

Second, Arthur Clark	3 00

Gratuity:—

Miss Alice L. Grinnell	2 00

AUGUST 18.

Gratuity:—

Misses Eleanor A. and Mollie S. Doran	1 00

AUGUST 25.

Gratuities:—

Miss Alice L. Grinnell	2 00
Misses Eleanor A. and Mollie S. Doran	1 00

SEPTEMBER 5.

NATIVE PLANTS.— Collection of forty bottles of named species and varieties, one bottle of each:

First, Miss Alice L. Grinnell	8 00
Second, Carl Blomberg	6 00
Third, Misses Eleanor A. and Mollie S. Doran	4 00

OCTOBER 6.

Gratuity:—

Misses Eleanor A. and Mollie S. Doran	2 00

APPLETON SILVER MEDAL.

Miss Alice L. Grinnell, she having taken four first prizes for Native Plants.

APPLETON BRONZE MEDALS.

Carl Blomberg, he having taken the next greatest number of first prizes for Native Plants.

Miss Edith Noyes, she having taken two first prizes for Cultivated Native Plants.

Estimated cost of Medals	$14 00
Amount appropriated for the use of the Committee	186 50
Amount of Prizes, Gratuities, and Medals	159 00
Balance unexpended	$27 50

REPORT

OF THE

Committee on Forestry and Roadside Improvement,

FOR THE YEAR 1900.

By HARVEY N. SHEPARD, CHAIRMAN.

The Committee on Forestry and Roadside Improvement respectfully report that during the year it has proceeded with the work previously begun relative to roadside trees, and, largely by means of its circulars of inquiry, has increased the replies of information from one hundred and twenty-five cities and towns of the Commonwealth, the number stated in its report of last year, to two hundred and twenty-five. The collation of this information is under way, and involves the mapping of the results of inquiries regarding the distribution of species and the consideration thereof from the point of view of life zones. This part of our work has come to the attention of Dr. C. Hart Merriam, Chief of the Division of Biological Survey, United States Department of Agriculture, who considers it to be of much scientific value and looks for the results of our investigation as likely to be of service in the general transcontinental work of his division.

The interest in roadside trees, to which we referred previously, continues, and the Committee has been brought into sympathetic touch with men and women throughout the Commonwealth who are interested in roadside improvement and are waiting anxiously the help which this Society can give. The correspondence required during the year, in keeping in touch with these people and others

in the same relation and by responding to their inquiries and requests for help in matters of information and advice, has been considerably more than last year, and has been of far reaching value in furthering the preservation and improvement of our roadside trees. The State Highway Commission welcomes our help in this respect. The two societies which today are doing the most to instruct and organize in these matters are the Massachusetts Forestry Association and our Society, and it is gratifying to be able to state that the workers in both societies are in cordial and sympathetic relation. The credit for this portion of our work is due almost entirely to the Secretary of the Committee, Mr. James Sturgis Pray.

We have begun upon another branch of our work in an endeavor to ascertain the economic value of wood planting in the Commonwealth, and trust to be able during the year to make a report relative thereto.

One of the duties confided to the Committee by the vote of the Society appointing its members, is the giving of information of the laws of the Commonwealth relative to forests and trees. In order that we might act intelligently upon this portion of our work, and also because such a compilation may be of value generally, we have made an examination of all the statutes of the Commonwealth relative to forests and trees, and have made a compilation thereof, which now is submitted to the Society, with our recommendation that it be printed in the form of a pamphlet for general distribution.

For the Committee,

HARVEY N. SHEPARD,
Chairman.

REPORT

OF THE

COMMITTEE OF ARRANGEMENTS,

FOR THE YEAR 1900.

By JOSEPH H. WOODFORD, CHAIRMAN.

As the last year of the Century draws to a close, we are glad to look back with satisfaction at the work performed by your Committee in the limited quarters at our disposal. The scheduled exhibitions have been generally very full and at times we have had difficulty in finding space for exhibitors to display their exhibits in a proper manner.

However, we now see in the near future the completion of our new hall where almost unlimited space will be at the disposal of all persons wishing to compete for the very liberal prizes offered by our Society.

The two exhibitions at which an admittance fee was charged were only fairly attended and the result was about the same as last year. The amounts received are appended at the end of this report.

The daily press have been vigilant in their reports of our exhibitions, and we are under obligations to them for such copious reports as have from time to time appeared in their columns. We are also under obligations to the numerous gardeners for the unflagging interest they display at the shows, and we try to make it interesting and attractive for them by the expenditure of the greater portion of the fund voted each year by our Society for extraordinary expenses of your Committee for their benefit.

By the unanimous vote or your Committee, the opening of the new Horticultural Building by a grand exhibition has been placed in competent hands, and we may expect early at the beginning of the new Century an exhibition of unusual magnificence.

Receipts at the Spring Show	$272 50
Receipts at the Chrysanthemum Show . . .	719 75
Total	$992 25

All of which is respectfully submitted,

J. H. Woodford,
William Wallace Lunt,
J. Woodward Manning,
E. W. Wood,
Warren Howard Heustis,
Patrick Norton,
Robert Farquhar,
Committee of Arrangements.

REPORT OF DELEGATE

TO THE

STATE BOARD OF AGRICULTURE,

FOR THE YEAR 1900.

As a new member of the Board, your delegate was assigned to the Committee on Experiments and Station work, and has twice visited the Station at Amherst, in June, and in September (when the crops were more fully developed), and examined the work of the Agricultural and Horticultural Departments under Professors Brooks and Maynard.

The experiments of Prof. Brooks with various fertilizers in combination on corn, potatoes, and other vegetables are very interesting and suggestive, and a very important study for cultivators, so many difficulties existing in the path of him who works against the obstacles which Nature interposes, may be quite smoothed away by understanding these chemical principles. Your delegate saw also the application of various manures for grass land, and the marked results from it; and the very successful work in the crop of clover (sown in midsummer) growing between the rows of ensilage corn.

Prof. Maynard, in the fruit department, furnished an object lesson for cultivators to judge by comparison what are the varieties best suited for their various purposes, as well as the best preventives of insect pests. Prof. Maynard has shown marked skill in the condition and variety of his greenhouse plants, also in the arrangement of his grounds, and the fine collection of hardy and half-hardy plants for his borders.

WM. H. SPOONER,

Delegate.

December 1st, 1900.

REPORT

TO THE

STATE BOARD OF AGRICULTURE,

FOR THE YEAR 1900.

HON. J. W. STOCKWELL, *Secretary State Board of Agriculture*,

DEAR SIR:—

As Inspector to the Massachusetts Horticultural Society I make the following report:

The Spring Exhibition of the Society opened March 20, 1900, with a splendid display of plants and flowers, Spring bulb plants, and a fine collection of fruits and vegetables. A collection of curious old Japanese plants, some one hundred years old, was shown. The Rhododendron Exhibition opened June 12th with many specimens of very excellent variety. In addition there were many potted and cut flowers. This exhibition was originally intended for June 6th, but the season being very unfavorable for the growth of these plants, it was postponed, and the visitors saw that nothing had been lost by waiting. June 22d the Rose and Strawberry Exhibition was opened, and there was in addition a very handsome display of grapes and peaches; also a large collection of vegetables. The roses were especially beautiful. September 5th and 6th the Annual Plant and Flower Show was held. Magnificent specimens of both were shown; also foreign grapes. September 27th and 28th the Fruit and Vegetable Show was held, the halls being filled with masses of familiar and new varieties. The number of varieties and novelties was greater than at any show the Society has held. November 6–9 the Chrysanthemum Show was held. There was an excellent collection of these flowers, many new kinds showing the skill of the gardener.

Prize exhibitions of plants and flowers were held on Saturday, January 6th and Saturday, February 3d, from 12 M. to 2 P.M. A prize exhibition of vegetables was held on Saturday, April 7th; one of plants, flowers, and vegetables, on Saturday, May 5th; one of pelargoniums, hardy primulas, and herbaceous plants, on Saturday, May 19th; a special Pæony Exhibition, on Saturday, June 16th; a special exhibition of aquatic plants, etc., on Saturday, August 18th; an exhibition of flowers, fruits, and vegetables, on Saturday, September 15th; and one of winter fruits and vegetables on Saturday, November 17th. All of these were open from 12 M. to 3 P.M. A special exhibition of orchids was held on Saturday, December 8th, from 12 M. to 2 P.M. Prize exhibitions were held every Saturday from June 30th to August 18th, inclusive.

The Society appropriated $8,150 for prizes for the year 1900.

April 1, 1901, the Society hopes to be in its new building, corner of Massachusetts and Huntington Avenues, where everything will be more to the advantage of the exhibitors.

Respectfully submitted,

N. I. Bowditch,

Inspector.

REPORT

OF THE

Committee on Lectures and Publication,

FOR THE YEAR 1900.

The Committee on Lectures and Publication submit the following report:

In the winter of 1900 we had the following Lectures delivered in our Hall:—

January 13. The Rusts of Horticultural Plants. By Professor Byron D. Halsted, of New Brunswick, N. J. This Lecture was delivered on the John Lewis Russell Foundation.

January 20. Half a Century's Experience in Ornamental Tree Planting. By O. B. Hadwen, Worcester.

January 27. The Procession of Fowers. By Miss Mira Lloyd Dock, Harrisburg, Pa.

February 10. Gardens, Fields, and Wilds of the Hawaiian Islands. By John K. M. L. Farquhar, Boston.

February 17. The Future Outlook for the Fruit Grower. By S. D. Willard, Geneva, N. Y.

February 24. Stereopticon Lecture on Massachusetts Forestry. By Mrs. Mary Lathrop Tucker, Newton. This Lecture was under the auspices of the Massachusetts Forestry Association.

March 10. Carnations and their Development. By C. W. Ward, Queens, N. Y.

March 17. Japanese Plums. By George S. Butler, Cromwell, Conn.

March 24. Apple Culture for Profit. By J. H. Hale, South Glastonbury, Conn.

March 31. Fungus Diseases Common to Cucumbers, Tomatoes, and Lettuce Under Glass. By Professor George E. Stone, Amherst.

We have also had the following printed: Schedule of Prizes for 1900, Part II of Transactions of 1899, and minor publications.

Respectfully submitted,

AARON LOW,
JAMES H. BOWDITCH, } *Committee.*
E. W. WOOD,

REPORT

OF THE

COMMITTEE ON THE LIBRARY,

FOR THE YEAR 1900.

The year has been a prosperous one, as far as the library is concerned and the accessions to its stores have been as numerous and as valuable as those of the average of preceding years. The proverb that when one door shuts another door opens, has been well exemplified during the last two years. When the Stickney Fund lapsed, it might have been thought that the Library would come to a stand-still as far as the purchase of books was concerned, but the following year the Society allowed the Committee $1000, all we asked for, and this year, though the amount granted was necessarily curtailed, we have received $85.00 from the sale of duplicate books, and $91.00 of interest from the Farlow bequest. Moreover, this bequest of $2,500 which the Society has voted to apply to the needs of the Library, and the direct bequest of $5000 from the late J. D. W. French will go far toward replacing the Stickney Fund. Three collections of books have been received during the year; one from the late Waldo O. Ross, a former Chairman of the Library Committee,— largely devoted to succulent plants, in which Mr. Ross was much interested; one from Mr. French, in addition to the bequest of money just mentioned, and the third from Charles E. Richardson, being a part of the library of the late John Owen.

For obvious reasons we say nothing about lack of room; that appeal so frequently made in the past may now be omitted for many years; when we next report we shall be in new quarters with nothing to complain of on that score.

For the Committee,

W. E. Endicott,
Chairman.

REPORT

OF THE

SECRETARY AND LIBRARIAN.

The work in this department has, as usual, not varied widely from that of most years. In one respect I wish that it had. In my last report I remarked that "a chairman of a committee or a lecturer has it just as much in his power as ever to delay publication of the Transactions by negligence in making his report or in returning his paper with revisions." These words were too true and publication has again been delayed from these causes. Other unavoidable circumstances, among them an illness of two weeks, largely caused by close application and confinement, in a discouraging struggle to cope with work beyond the ability of the force employed here, have conspired to delay publication beyond what was desired and hoped for. The Schedule of Prizes, however, formed no exception to the rule that it should be ready by the first of January, and as much earlier as possible. The second part of the Transactions for 1899 was published in June, and the first part for 1900 is now nearly through the press. The Society may be assured that no efforts on my part or on the part of those who assist in the work in this room will be wanting to have all publications appear as early as possible, but we cannot undertake the impossible. I may add that one other society in this state has experienced the same trouble in the prompt issue of its publications, from the same causes that I have mentioned above.

In my last report I mentioned that on account of the crowded state of the bookcases it was deemed better to employ a larger part than before of the Society's appropriation in the binding of books and less in the purchase of books, and that this purpose had been carried out. It has been continued in the year since my last report, with the result that the number of books bound has been greater than in any previous year.

In 1896, at the suggestion of President Appleton, a special effort was made to procure such publications of the United States Department of Agriculture as we did not already possess. This effort has been continued to the present time, with the result that our set of these publications is very nearly complete. Its value will be greatly increased by a Card Catalogue of these publications which was begun by the Department during the present year, and is supplied gratuitously to all libraries deemed worthy to receive it. This result will, however, not be obtained without adding to the labor of those whose duty it is to care for the library, who already had in their charge three card catalogues, the smallest of which contains 20,000 cards.

The present year has been remarkable beyond any preceding one in the reception of three donations of books from deceased members, we having had the privilege of selecting such books as we desired from the libraries of Waldo O. Ross, a former Chairman, and J. D. W. French, a member, of the Library Committee. Our Treasurer, Charles E. Richardson, has also afforded us the same privilege with regard to the library of his uncle, the late John Owen. Mr. Ross having been especially interested in Succulent Plants, a large proportion of the books received from his library are on that subject, and in like manner those from Mr. French relate largely to Forestry, which was a favorite subject with him. Among these gifts are many valuable books which fill gaps in the Library that we have long desired to efface.

A gift of another class is "One Thousand American Fungi," by Charles McIlvaine and Robert K. Macadam, with colored plates and many other illustrations. A gratifying circumstance in connection with the acquisition of this book, on a subject in which so much interest is now felt, is that it was presented by Mr. Macadam in acknowledgment of the help derived from this library in its preparation. Another book on this subject is "Mushrooms, Edible, Poisonous, etc.," by George Francis Atkinson, Professor of Botany, in Cornell University. This book, which was acquired by purchase, is illustrated with many excellent photographs and colored plates.

Other notable acquisitions are the eighth and best edition of "Miller's Gardener's Dictionary;" also the first fôlio edition; "Munting's Phytographia Curiosa," folio, 1727; and a reprint of

"Walter of Henley's Husbandry," a work dating back to the thirteenth century. Lamarck's "Tableau Encyclopédique" has been completed, an object at which we have been aiming for several years. The new editions of Veitch's "Manual of the Coniferæ," and Barron's "Vines and Vine Culture," have been presented by the authors. Two volumes of Professor Bailey's Cyclopedia of American Horticulture have been published during the year, and of this comprehensive work we have bought two copies, in order to have one for circulation as well as reference. The same course has been pursued with regard to Nicholson's "Dictionary of Gardening," of which a supplementary volume has been published, to be followed by a second; and also with regard to some other works that are desired both for reference here and for home study. "The Century Book of Gardening" is an elegant work, which seems to have been suggested by the close of one century and the beginning of another. "The Book of Gardening, a Hand-book of Horticulture," edited by W. D. Drury, is a solid and comprehensive manual. Both these works are very fully illustrated. Mawson's "Art and Craft of Gardening," is one of the latest works specially devoted to landscape gardening. Eight more volumes of King's Photographs have been received during the year, containing views in parks in Rochester, Albany, Philadelphia, Baltimore, New York, Providence, Springfield, Washington, Buffalo, Detroit, Boston, and other cities, and also in Biltmore. "Nature's Garden, an aid to Knowledge of our Wild Flowers and their Insect Visitors," by Neltje Blanchan, with many colored plates, and other illustrations, is a more extensive attempt than those previously made to assist in the study of flowers by classifying them according to color.

"Our Native Ferns, a History of the British Species and their Varieties," by E. J. Lowe, in two volumes, with seventy-nine colored plates, and nine hundred and seventy-six wood cuts, is believed to make our collection of the books of this enthusiast in fern study and culture complete. Harshberger's "Botanists of Philadelphia and their Work," is an exceedingly interesting contribution to the history of Botany in America. Many more might be mentioned, but we must cease with the "Flore d'Owara et de Benin en Afrique," a folio volume by M. Palisot-Beauvois, with one hundred and twenty colored plates of the plants of that region.

Before the close of another year we trust that the Library will be in a room where there is space enough to permit of the arrangement of the books so that one volume shall never be hidden by another.

ROBERT MANNING,

Secretary and Librarian.

TREASURER'S REPORT.

FOR THE YEAR 1900.

MASSACHUSETTS HORTICULTURAL SOCIETY, *in account current with* CHARLES E. RICHARDSON, *December 31st, 1900.*

DR.

To amount paid on account of Library in 1900 . . .		$700 00
" " " Interest on Funds for Prizes, credited opposite		1,792 99
" " " Mortgage		225,000 00
" " " Interest on Mortgage		4,025 00
" " " on account of Building on Massachusetts Ave.		87,696 83
" " loaned on call with collateral security . . .		130,000 00
" " " Wm. A. Hayes and A. P. Loring, Trustees		3,488 76
" " paid for Chicago & West Michigan R. R. Bonds .		9,987 50
" " " " Kansas City, Fort Scott & Memphis R.R. Bonds		27,523 75
" " " " Chicago, Burlington & Quincy, Ill. Div., R. R. Bonds		51,625 00
" " " " Legal Services in settlement of F. B. Hayes's Estate		3,586 35
" " " " Taxes on Real Estate in South Boston .		189 63
" " " on Prizes awarded in 1899 paid in 1900, viz.:		
" " " " for Plants . .	$2,072 10	
" " " " " Flowers . .	2,061 27	
" " " " " Fruits . . .	1,596 00	
" " " " " Vegetables . .	1,185 80	
" " " " " Gardens and Greenhouses .	365 00	
" " " " " Native Plants .	167 85	
" " " " " School Gardens and Children's Herbariums	112 50	
" " " " " H. H. Hunnewell Triennial Prize .	160 00	
" " " " " H. H. Hunnewell, Prizes for Rhododendrons	105 00	
		$7,825 52
Amount carried forward		$553,441 33

Amount brought forward		$553,441 33
To amount paid for Heating	$638 41	
" " " " Lighting	691 72	
" " " " Water Rates	211 28	
" " " " Labor	2,247 87	
" " " " Stationery, Printing, and Postage	1,361 89	
" " " " Taxes	2,998 00	
" " " " Incidentals	1,402 58	
" " " " Repairs . . .	136 97	
" " " " Committee of Arrangements	289 50	
" " " " " on School Gardens and Children's Herbariums	37 92	
" " " " Committee on Lectures and Publication . . .	245 00	
" " " " Committee on Forestry and Roadside Improvement	9 25	
" " " " Salaries of Treasurer, Secretary and Assistants . .	4,300 00	
" " " " Salaries of Committees .	1,160 00	
" " " " Rent of Building on Tremont Street	11,733 33	
" " " " Legal Services . . .	85 00	
		27,548 72
		$580,990 05
Balance of Cash December 31st, 1900		74,864 73
		$655,854 78

CR.

By Balance of account rendered December 30, 1899 . .			$23,920 27
Received from Sale of Estate on Tremont Street. . . .	$600,000 00		
Less Commission and Advertising	6,132 05		
		$593,867 95	
Received from Loan of Tables		22 00	
" " Building in 1900, viz.:			
" " Rent of Halls . .	1,840 00		
" " " " Stores . .	13,520 00		
		15,360 00	
" " Admissions and Assessments .		1,554 00	
" " Annual Exhibitions, Gross	992 25		
Less Expenses .	442 62		
		549 63	
Amounts carried forward		$611,353 58	$23,920 27

Amounts brought forward . . .		$611,353 58	$23,920 27
Received from Mt. Auburn Cemetery . . .		3,410 69	
" " State Bounty		600 00	
" " Sales of Transactions . . .		6 50	
" " Interest on Bonds .	7,490 77		
" " " " Bank Balances	3,004 39		
		10,495 16	
" " Insurance		67 83	
" " Bequest of John S. Farlow . .		2,541 09	
" " " " Francis Brown Hayes .		1,666 67	
" Interest credited the following Funds charged opposite:			
Samuel Appleton Fund .	$50 00		
John A. Lowell " .	50 00		
Theodore Lyman " .	550 00		
Josiah Bradlee " .	50 00		
Benjamin V. French " :	25 00		
W. J. Walker " .	117 72		
Levi Whitcomb " .	25 00		
Benjamin B. Davis " .	25 00		
Marshall P. Wilder " .	50 00		
John Lewis Russell " .	50 00		
H. H. Hunnewell " .	200 00		
Francis Brown Hayes " .	500 00		
Henry A. Gane " .	50 00		
John S. Farlow " .	50 27		
		1,792 99	
			631,934 51
			$655,854 78

(Signed) CHARLES E. RICHARDSON,
Treasurer.

Approved:

WALTER HUNNEWELL,
C. S. SARGENT,
O. B. HADWEN,
} *Finance Committee.*

28 State Street, Boston, March 7, 1901.

MESSRS. WALTER HUNNEWELL,
CHARLES S. SARGENT,
O. B. HADWEN,
Finance Committee of the Massachusetts Horticultural Society.

Gentlemen:— In compliance with your request, I have made a thorough audit of the books and general accounting affairs of the

Massachusetts Horticultural Society for the year which ended with December 31st, 1900, and herewith submit to you my report of the same.

Report.

I added the ledger, journal and cash book and the small books tributary to the cash book, and saw that all balances were correctly carried forward, and examined and checked the vouchers representing the disbursements during the year and found them adequate. I also traced all postings from journal and cash book into the ledger and proved the correctness of the balance sheet taken from the ledger as of the 31st day of December, 1900, which is a true statement of the financial condition of the Society upon said date, to the best of my knowledge and belief. I found the amount of cash required by the cash book upon the first day of January, 1901 to have been on hand, and I examined the securities of the Society in the custody of the Treasurer and found that they were in accordance with the requirements of the record. In short, I satisfied myself that the work in connection with the accounting matters of the Society was being honestly and faithfully performed.

Yours Very Respectfully,

ANDREW STEWART,

Examiner of Accounts.

ASSETS AND LIABILITIES OF THE MASSACHUSETTS HORTICULTURAL SOCIETY.

DECEMBER 31, 1900.

ASSETS.

Real Estate	$318,084 08	
" " in South Boston	358 62	
Furniture and Exhibition Ware	7,707 50	
Library	39,812 47	
Stereotype Plates and Copies of History	246 50	
Sinking Fund	23,872 50	
Chicago, Burlington & Quincy R. R. Bonds	1,000 00	
Kansas City, Clinton & Springfield " "	1,980 00	
Lake Shore & Michigan Southern " "	10,415 25	
Atchison, Topeka & Santa Fé " "	44,693 25	
Chicago, Burlington & Quincy, Nebraska Extension, R. R. Bonds	50,012 50	
Chicago & West Michigan R. R. Bonds	9,987 50	
Kansas City, Fort Scott & Memphis R. R. Bonds	27,523 75	
Chicago, Burlington & Quincy, Ill. Division, R. R. Bonds	51,625 00	
City of Newton Bonds	24,228 75	
Loan with Collateral Security	130,000 00	
" to W. A. Hayes and A. P. Loring, Trustees	3,488 76	
Bills Receivable	6,630 79	
Cash	74,864 73	
		$826,531 95

LIABILITIES.

Prize Funds invested in Building:			
Samuel Appleton Fund,	$1,000 00		
Theodore Lyman "	11,000 00		
Josiah Bradlee "	1,000 00		
Benjamin V. French "	500 00		
H. H. Hunnewell "	3,000 00		
W. J. Walker "	2,354 43		
Levi Whitcomb "	500 00		
Benjamin B. Davis "	500 00		
John Lewis Russell "	1,000 00		
Francis Brown Hayes "	10,000 00		
Henry A. Gane "	1,000 00		
		$31,854 43	
Amount carried forward		$31,854 43	

Amount brought forward		$31,854 43		
Prize Funds invested in Bonds:				
Marshall P. Wilder Fund	1,000 00			
John A. Lowell "	1,000 00			
H. H. Hunnewell "	1,000 00			
		3,000 00		
			34,854 43	
Prizes for 1900 payable in 1901			8,275 00	
				$43,129 43
Surplus				783,402 52
				$826,531 95

C. E. RICHARDSON,
Treasurer.

Membership Account of the Massachusetts Horticultural Society, December 31st, 1900.

Life Membership per last report	659		
Added in 1900	35		
Commuted from Annual	2		
Reinstated	1		
		697	
Deceased		15	
			682
Annual Membership per last report	199		
Added in 1900	11		
		210	
Commuted to Life	2		
Resigned	1		
Deceased	4		
Dropped for non-payment of Assessment for two years	4		
		11	
			199
Present Membership			881

INCOME FROM MEMBERSHIP.

35 new Life Members @ $30	$1,050 00
2 Commuted to Life at @ $20	40 00
11 new Annual Members @ $10	110 00
Annual Assessments	354 00
	$1,554 00

C. E. RICHARDSON,
Treasurer.

Dr. *Massachusetts Horticultural Society in account with the Proprietors of the Cemetery of Mount Auburn.* **Cr.**

For Sales and Improvements within the Cemetery for the year ending December 31, 1900.

To cost of filling up and improving land at Mount Auburn for the year ending Dec. 31st, 1900, the Massachusetts Horticultural Society being charged with their proportion of same:			By Sales in January	$985 00
Rear Fern Path	$97 87		" " " February	615 00
Between Cherry and Birch Avenues	61 87		" " " March	460 00
Glen Avenue	46 50		" " " April	792 00
	$206 24		" " " May	1,309 50
One-fourth part of $206.24	$51 56		" " " June	1,420 00
Balance due Mass. Horticultural Society,	3,410 69		" " " July	525 00
			" " " August	1,380 00
			" " " September	957 50
			" " " October	1,140 00
			" " " November	1,230 00
			" " " December	3,500 00
				$14,314 00
			Net amount received from Receiving Tomb	935 00
				$15,249 00
			Deduct for annual expenses	1,400 00
				$13,849 00
		$3,462 25	Mass. Horticultural Society, ¼ part of $13,849.00	$3,462 25

E. & O. E.

DECEMBER 31, 1900.

JONH L. DILL, *Treasurer.*

THE MASSACHUSETTS HORTICULTURAL SOCIETY

To the PROPRIETORS OF THE CEMETERY OF MOUNT AUBURN. *Dr.*

To cost of filling up and improving land at Mount Auburn for the year ending Dec. 31st, 1900, the Massachusetts Horticultural Society being charged with their proportion of same.

Rear Fern Path.		
11.1 days, man and horse	$41 62	
25 days, man	56 25	
		$97 87
Between Cherry and Birch Avenues.		
16.5 days, man and horse		61 87
Glen Avenue.		
12.4 days, man and horse		46 50
		$206 24
One-fourth of $206.24		$51 56

JAMES C. SCORGIE,
Supt. of the Cemetery of Mount Auburn.

MOUNT AUBURN, December 31, 1900.

I certify the foregoing to be a true copy of improvements for the year 1900, rendered by the Superintendent.

JOHN L. DILL,
Treasurer.

Massachusetts Horticultural Society.

OFFICERS AND STANDING COMMITTEES FOR 1901.

President.

O. B. HADWEN, OF WORCESTER.

Vice-Presidents.

WALTER HUNNEWELL, OF WELLESLEY.

BENJAMIN P. WARE, OF CLIFTON.

CHARLES F. CURTIS, OF JAMAICA PLAIN.

BENJAMIN M. WATSON, OF JAMAICA PLAIN.

Treasurer and Superintendent of the Building.

CHARLES E. RICHARDSON, OF BROOKLINE.

Secretary and Librarian.

ROBERT MANNING, OF SALEM.*

Professor of Botany and Vegetable Physiology.

BENJAMIN M. WATSON, OF JAMAICA PLAIN.

Professor of Entomology.

SAMUEL H. SCUDDER, OF CAMBRIDGE.

Delegate to the State Board of Agriculture.

WILLIAM H. SPOONER, OF JAMAICA PLAIN.

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*Communications to the Secretary, on the business of the Society, should be addressed to him at Horticultural Hall, Boston

STANDING COMMITTEES.

Executive.

THE PRESIDENT, O. B. HADWEN, CHAIRMAN.

THE CHAIRMAN OF THE FINANCE COMMITTEE, WALTER HUNNEWELL, *Ex officio*.

WILLIAM C. STRONG.
WILLIAM H. SPOONER.
NATHANIEL T. KIDDER.
FRANCIS H. APPLETON.
BENJAMIN C. CLARK.
CHARLES W. PARKER.
CHARLES F. CURTIS.

Finance.

WALTER HUNNEWELL, OF BOSTON, CHAIRMAN.

O. B. HADWEN.
CHARLES S. SARGENT.

Lectures and Publication.

AARON LOW, OF HINGHAM, CHAIRMAN.

JAMES H. BOWDITCH.
E. W. WOOD.

Library.

WILLIAM E. ENDICOTT, OF CANTON, CHAIRMAN.

GEORGE W. HUMPHREY.
WALTER S. PARKER.
GEORGE E. DAVENPORT.
CHARLES W. SWAN.

Plants.

[CHAIRMANSHIP VACANT.]

JAMES WHEELER.
WILLIAM J. MARTIN.
ARTHUR H. FEWKES.
ROBERT CAMERON.

Flowers.

J. WOODWARD MANNING, OF READING, CHAIRMAN.

MICHAEL H. NORTON.
KENNETH FINLAYSON.
FREDERICK S. DAVIS.
JAMES COMLEY.

Fruits.

E. W. WOOD, OF WEST NEWTON, CHAIRMAN.

CHARLES F. CURTIS.
O. B. HADWEN.
WARREN FENNO.
J. WILLARD HILL.
SUMNER COOLIDGE.
GEORGE F. PIERCE.

Vegetables.

WARREN H. HEUSTIS, OF BELMONT, CHAIRMAN.

CEPHAS H. BRACKETT.
VARNUM FROST.
WALTER RUSSELL.
AARON LOW.
GEORGE D. MOORE.
JOSHUA C. STONE.

Forestry and Roadside Improvement.

HARVEY N. SHEPARD, CHAIRMAN.

NATHANIEL S. SHALER.
HENRY S. HUNNEWELL.
J. WOODWARD MANNING.
JAMES STURGIS PRAY, SECRETARY.

Gardens.

PATRICK NORTON, OF DORCHESTER, CHAIRMAN.

CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND ARRANGEMENTS, *Ex-officiis.*

HENRY W. WILSON.
JACKSON T. DAWSON.

For Establishing Prizes.

WILLIAM J. STEWART, OF WINCHESTER, CHAIRMAN.

CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND GARDENS, *Ex-officiis.*

WILLIAM J. MARTIN.

Committees of Arrangements.

JOSEPH H. WOODFORD, OF BOSTON, CHAIRMAN.

CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND GARDENS, *Ex-officiis.*

ROBERT FARQUHAR.

MEMBERS FOR LIFE.

Members of the Society and all other persons who may know of deaths, changes in residence, or other circumstances showing that the following list is incorrect in any particular, will confer a favor by promptly communicating to the Secretary any needed corrections.

Information, or any clew to it, is especially desired in regard to members whose names are marked thus.†

Adams, Mrs. Charles Francis, South Lincoln.
Adams, Henry Saxton, Dorchester.
Adams, Luther, Newton.
Alger, Rev. R. F., Becket.
Allen, Hon. Charles H., Lowell.
Allen, Thomas, Boston.
Ames, F. Lothrop, North Easton.
Ames, Mrs. F. L., North Easton.
Ames, George, Boston.
Ames, John S., North Easton.
Ames, Miss Mary S., North Easton.
Ames, Oakes, North Easton.
Ames, Oliver, North Easton.
Ames, Mrs. Oliver, Sr., North Easton.
Ames, Preston Adams, Boston.
Ames, Miss Susan E., North Easton.
Amory, C. W., Boston.
Amory, Frederick, Boston.
Anderson, Larz, Brookline.
Andrews, Charles L., Milton.
Andrews, Frank W., Washington, D. C.
Andros, Milton, San Francisco, Cal.
Appleton, Francis H., Boston.
Appleton, William S., Boston.
Arnold, Mrs. George Francis, Brookline.
Ash, John, Pomfret Centre, Conn.
Asmus, Ernst G., West Hoboken, N. J.
Atkins, Edwin F., Belmont.
Ayer, James B., Boston.

Bailey, Jason S., West Roxbury.
Ball, George H., Boston.
Bancroft, John C., Boston.
Banfield, Francis L., M.D., Worcester.
Barber, J. Wesley, Newton.
Barnard, James M., Boston.
Barnard, Robert M., Everett.
Barnes, Walter S., Somerville.
† Barney, Levi C., Boston.
Barry, John Marshall, Boston.
Barry, William C., Rochester, N. Y.
Bartlett, Edmund, Newburyport.
Bartlett, Francis, Beverly.
Baylies, Walter C., Taunton.
Beal, Leander, Swampscott.
Becker, Frederick C., Cambridge.
Beckford, Daniel R., Jr., Dedham.
Beebe, E. Pierson, Boston.
Beebe, Franklin H., Boston.
Beebe, J. Arthur, Boston.
Bigelow, Albert S., Cohasset.
Bigelow, Joseph S., Cohasset.
Bigelow, Dr. William Sturgis, Boston.
Black, George N., Manchester.

Blake, Miss Anne, Brookline.
Blake, Mrs Arthur W , Brookline.
Blake, Edward D., Boston.
Blake, Francis, Weston.
Blake, Frederick A., Rochdale.
Blakemore, John E., Roslindale.
Blanchard John W., West Newton.
Blinn, Richard D., Chicago, Ill.
Bliss, William, Boston.
Boardman, Samuel M., Hyde Park.
Boardman, T. Dennie, Manchester.
Bôcher, Prof. Ferdinand, Cambridge.
Bockus, Charles E., Dorchester.
Bosler, Frank C., Carlisle, Penn.
Bowditch, Charles P., Jamaica Plain.
Bowditch, Ernest W., Milton.
Bowditch, James H., Brookline.
Bowditch, Nathaniel I., Framingham.
Bowditch, William E., Roxbury.
Bowker, William H., Boston.
Brackett, Cephas H., Newton.
Breck, Joseph Francis, Allston.
Bremer, Mrs. John L., Manchester.
Bresee, Albert, Hubbardton, Vt.
Brewer, Francis W., Hingham.
Briggs, William S., Lincoln.
Brigham, William T., Honolulu, Hawaii.
Brooks, Henry, Lincoln.
Brooks, J. Henry, Milton.
Brooks, Lawrence, Groton.
Brooks, Peter C , Boston.
Brooks, Shepherd, Boston.
Brown, Edward J., Weston.
Brown, George Barnard, Brookline.
Brown, John M., Belmont.
Brown, John T., Newburyport.
Brown, Samuel N., Boston.
Burlen, William H., Boston.
Burnett, Harry, Southborough.
Burnham, John A., Manchester.
Burnham, Lamont G., Essex.
Burr, Matthew H., Hingham.
Buswell, Frank E., Brooklyn, N Y.
Butler, Aaron, Wakefield.
Butler, Edward K., Jamaica Plain.
Cabot, Dr. Arthur T., Boston.
†Cadness, John, Flushing, N. Y.
Cains, William, South Boston.
Calder, Augustus P., Boston.
Cameron, Robert, Cambridge.
Campbell, Francis, Cambridge.
Capen, John, Boston.
Carlton, Samuel A., Boston.
Carr, Hon. John, Roxbury.
Carter, Charles N., Boston.
Carter, Miss Maria E., Woburn.
Cartwright, George, Dedham.
Casas, W. B. de las, Malden.
Chadbourne, Marshall W., East Watertown.
Chaffin, John C., Newton.
Chamberlain, Chauncy W., Brookline.
†Chase, Andrew J., Lynn.
Chase, Daniel E , Somerville.
Chase, George B., Dedham.
Chase, William M , Dorchester.
Cheney, Amos P., Natick.
Cheney, Mrs. Elizabeth S., Wellesley.
Childs, Nathaniel R., Boston.
Choate, Charles F., Southborough.
Christie, William, Chelsea.
Claflin, Hon. William, Newtonville.
Clapp, Edward B., Dorchester.
Clapp, James H., Dorchester.
Clapp, William C., Dorchester.
Clark, Benjamin C., Boston.
Clark, B. Preston, Cohasset.
Clark, Miss Eleanor J., Pomfret Centre, Conn.
Clark, J. Warren, Rockville.
Clarke, Miss Cora H., Boston.
Clarke, Eliot C., Boston.
Cleary, Lawrence, Roxbury.
Clough, Micajah Pratt, Lynn.
Cobb, John C., Milton
Coburn, Isaac E., Everett.
Codman, James M., Brookline.
Codman, Ogden, South Lincoln.
Cole, Edward E., Boston.

Collamore, Miss Helen, Boston.
Colton, Samuel H., Worcester.
Converse, Elisha S., Malden.
Converse, Col. H. E., Malden.
Coolidge, Joshua, Mount Auburn.
Coolidge, J. Randolph, Chestnut Hill.
Coolidge, Mrs. J. Randolph, Chestnut Hill.
Coolidge, T. Jefferson, Jr., Boston.
Cottle, Henry C., Boston.
Cowing, Walter H., Brookline.
Cox, Thomas A., Dorchester.
Coy, Samuel I., Boston.
Crane, Zenas, Dalton.
Crawford, Dr. Sarah M., Roxbury.
Crocker, Hon. George G., Boston.
Crocker, Miss S. H., Boston.
Crosby, George E., West Medford.
Crowell, Randall H., Watertown.
Curtis, Charles F., Jamaica Plain.
Curtis, Charles P., Swampscott.
Curtis, Charles P., Jr., Boston.
Cushing, Livingston, Weston.
Cushing, Robert M., Boston.
Cutting, Gen. Walter, Pittsfield.

† Daggett, Henry C., Boston.
Dalton, Charles H., Beverly.
Daly, John C., Roxbury.
Damon, Frederick W., Arlington.
Dana, Charles B., Wellesley.
Daniels, Dr. Edwin A., Boston.
Davenport, Albert M., East Watertown.
Davenport, Edward, Dorchester.
Davenport, George E., Medford.
Davis, Edward L., Worcester.
Davis, John, Lowell.
Davis, L. Shannon, Brookline.
Dawson, Jackson T., Jamaica Plain.
Dee, Thomas W., Cambridge.
Denny, Clarence H., Boston.
Denton, Eben, Dorchester.
Dewson, Francis A., Newtonville.
Dexter, F. Gordon, Boston.
Dexter, George, Beverly.
Dike, Charles C., Stoneham.
Doliber, Thomas, Brookline.
Donald, William, West Roxbury.
Donaldson, James, Roxbury.
Dorr, George, Dorchester.
Dove, George W. W., Andover.
Dowse, William B. H., West Newton.
Draper, Hon. Eben S., Hopedale.
Draper, George A., Hopedale.
Dreer, William F., Philadelphia, Pa.
Dumaresq, Herbert, Chestnut Hill.
Duncan, James L., Chelsea.
Dunlap, James H., Nashua, N. H.
Durant, William, Boston.
Durfee, George B., Fall River.
Dutcher, Frank J., Hopedale.
Dwight, Theodore F., Kendal Green.

Eaton, Horace, Cambridge.
Edgar, William W., Waverly.
Eldredge, H. Fisher, Boston.
† Eldridge, E. H., Roxbury.
Ellicott, Joseph P., Boston.
Elliot, Mrs. John W., Boston.
Elliott, William H., Brighton.
Endicott, William, Boston.
Endicott, William, Jr., Boston.
Endicott, William C., Jr., Danvers.
Endicott, William E., Canton.
Estabrook, Arthur F., Boston.
Ewell, Warren, Dorchester.

Fairchild, Charles, Boston.
Falconer, William, Pittsburgh, Pa.
Farlow, Lewis H., Newton.
Farlow, Mrs. William G., Cambridge.
Farnsworth, Mrs. William, Dedham.
Farquhar, James F. M., Roslindale.
Farquhar, John K. M. L., Roxbury.
Farquhar, Robert, North Cambridge.
Faxon, John, Quincy.
Fay, H. H., Wood's Holl.
Fay, Joseph S., Jr., Wood's Holl.
Fenno, L. Carteret, Boston.
Fessenden, George B., Allston.
Fewkes, Arthur H., Newton Highlands.

Finlayson, Kenneth, Brookline.
Fisher, James, Roxbury.
Flagg, Augustus, Boston.
Fletcher, George V., Belmont.
Fletcher, J. Henry, Belmont.
Fletcher, John W., Chelsea.
Flint, David B., Boston.
Foster, Charles H. W., Brookline.
Foster, Francis C., Cambridge.
Fottler, John, Jr., Dorchester.
Fowle, George W., Jamaica Plain.
Fowle, William B., Auburndale.
French, Miss Caroline L. W., Boston.
French, Jonathan, Boston.
French, S. Waldo, Jamaica Plain.
French, W. Clifford, Cambridge.
Frohock, Roscoe R., Malden.
Frost, Irving B., Belmont.

Galloupe, Charles W., Swampscott.
Galvin, John, Boston.
Gardner, George A., Boston.
Gardner, George P., Boston.
Gardner, John L., Boston.
Gardner, Mrs. John L., Brookline.
Gardner, William Amory, Groton.
Gaston, William A., Boston.
Gibbs, Wolcott, M.D., Newport, R.I.
Gill, George B., Medford.
Gillard, William, Dorchester.
Gilmore, E. W., North Easton.
Gilson, F. Howard, Wellesley Hills.
Glover, Joseph B., Boston.
Goddard, A. Warren, Brookline.
Goddard, Joseph, Sharon.
Goodell, L. W., Dwight.
Gorham, James L., Jamaica Plain.
† Gould, Samuel, Boston.
Gowing, Mrs. Clara E., Kendal Green.
Gray, James, Wellesley.
Gray, Mrs. John C., Boston.
Gregory, Hon. James J. H., Marblehead.
Grew, Edward S., Boston.
Grey, Benjamin, Malden.

Hadwen, Obadiah B., Worcester.
Hale, James O., Byfield.
Hall, Edwin A., Cambridgeport.
Hall, George A., Chelsea.
Hall, Jackson E., Boston.
Hall, Osborn B., Malden.
Hall, William F., Brookline.
Halliday, William H., South Boston.
Hammond, Gardiner G , New London, Conn.
Hammond, George W., Boston.
† Harding, George W., Arlington.
Harding, Louis B., Stamford, Conn.
Hardy, F. D., Cambridgeport.
Harlow, James F., Quincy.
Harris, Charles, Cambridge.
Harris, Thaddeus William, A.M., Keene, N. H.
Hartshorn, Arthur E., Worcester.
Harwood, George Fred, Newton.
Haskell, Edwin B., Auburndale.
Hastings, Levi W., Brookline.
Hatch, Mrs C. S., North Cambridge.
Hatch, Edward, Boston.
Haven, Franklin, Boston.
Hawken, Mrs. Thomas, Rockland, Me.
Hayward, George P., Roxbury.
† Hazeltine, Hazen, Boston.
Hemenway, Augustus, Canton.
Hemenway, Mrs. Augustus, Canton.
Henshaw, Joseph P. B., Boston.
Henshaw, Samuel, Cambridge.
Heurlin, Julius, South Braintree.
Hewett, Miss Mary C., Canton.
Hews, Albert H., North Cambridge.
Higginson, Francis L., Boston.
Hilbourn, A. J., Boston.
Hill, John, Stoneham.
Hittinger, Jacob, Mt. Auburn.
Hoar, Samuel, Concord.
Hodgkins, John E., Portsmouth, N.H.

Hoitt, Hon. Charles W., Nashua, N. H.
Hollingsworth, Amor L., Milton.
Hollingsworth, Z T., Boston.
Hollis, George W., Grantville.
Holt, Gustavus C., Belmont.
Holt, Mrs. Stephen A., Winchester.
Holt, William W., Winchester.
Hooper, William, Boston.
Horner, Mrs. Charlotte N.S., Georgetown.
Hovey, Charles H., South Pasadena, Cal.
Hovey, Stillman S., Woburn.
Howard, Joseph W., Somerville.
Hubbard, Charles Wells, Weston.
Hubbard James C., Everett.
Humphrey, George W., Dedham.
Hunnewell, Arthur, Wellesley.
Hunnewell, Henry Sargent, Wellesley.
Hunnewell, H. Hollis, Wellesley.
Hunnewell, Walter, Wellesley.
Hunt, Dudley F., Reading.
Hunt, Francis W., Melrose.
Hunt, Franklin, Charlestown, N. H.
Hunt, William H , Concord.

Jack, John George, Jamaica Plain.
Jackson, Charles L., Cambridge.
Jackson, Robert T., Boston.
James, George Abbot, Nahant.
Janvrin, William S., Revere.
Jeffries, William A., Boston.
Jenks, Charles W., Bedford.
Johnson, J. Frank, Malden.
Jones, Jerome, Brookline.
Jones, Dr. Mary E , Boston.
Jordan, Eben D , Boston.
Jordan, Henry G., Hingham.
Jose, Edwin H., Cambridgeport.

Kakas, Edward, West Medford.
Kellen, William V., Marion.
Kelley, George B., Jamaica Plain.
Kendall, D. S., Woodstock, Ont.
Kendall, Edward, Cambridgeport.
† Kendall, Joseph R., San Francisco, Cal.
Kendall, Dr. Walter G , Atlantic.
Kendrick, Mrs. H. P., Allston.
Kennedy, George G , M. D., Roxbury.
Kent, John, Chestnut Hill.
† Keyes, E. W., Denver, Col.
Keyes, John M., Concord.
Kidder, Charles A., Southborough.
Kidder, Nathaniel T., Milton.
† Kimball, A. P., Boston.
Kimball, David P., Boston.
King, D. Webster, Boston.
Kingman, Abner A., Brookline.
Kingman, C. D., Middleborough.
Knapp, Walter H., Newtonville.

Lamb, Horatio A., Milton.
Lancaster, Charles B., Boston.
Lanier, Charles, Lenox.
Lawrence, Amory A , Boston.
Lawrence, Amos A., Boston.
Lawrence, James, Groton.
Lawrence, John, Groton.
Lawrence, Rt. Rev. William, Boston.
Learned, Charles A., Arlington.
Lee, Daniel D., Jamaica Plain.
Lee, Francis H., Salem.
Lee, George C., Newton.
Leeson, Hon. Joseph R., Newton Centre.
Lemme, Frederick, Charlestown.
Leuchars, Robert B., Dorchester.
Lewis, Edwin C., Taunton.
Lewis, William G., Framingham.
Lincoln, George, Hingham.
Lincoln, Col. Solomon, Boston.
Little, James L., Brookline.
Little, John Mason, Swampscott
Locke, Isaac H., Belmont.
Lockwood, Rhodes, Boston.
Lodge, Richard W., Boston.

Loftus, John P., Dorchester.
Loomis, Elihu G., Bedford.
Loring, Augustus P., Beverly.
Loring, Mrs. William Caleb, Beverly.
Lothrop, William S. H , Boston.
† Lowder, John, Watertown.
Lowell, Abbott Lawrence, Boston.
Luke, Otis H., Brookline.
Lumb, William, Boston.
Lunt, William W., Hingham.
Lyman, George H., Wareham.
Lyman, Mrs. Theodore, Brookline.

Mabbett, George, Plymouth.
Mackie, George, M. D., Attleboro.
† Mahoney, John, Boston.
Mallett, E. B., Jr., Freeport, Me.
Mann, James F., Ipswich.
Manning, Jacob W., Reading.
Manning, J. Woodward, Reading.
Manning, Mrs. Lydia B., Reading.
Manning, Robert, Salem.
Manning, Warren H., Brookline.
Marshall, Frederick F., Everett.
Marston, Howard, Boston.
Mason, Miss Ellen F., Boston.
Mason, Col. Frederick, Taunton.
Matthews, Nathan, Boston.
May, Frederick W. G., Boston.
McCarty, Timothy, Providence, R. I.
McWilliam, George, Whitinsville.
Melvin, James C., West Newton.
Merriam, Charles, Boston.
Merriam, Herbert, Weston.
Merrill, Hon. Moody, Roxbury.
Metivier, James, Cambridge.
Milmore, Mrs. Joseph, Washington, D. C.
Minot, Charles S., Milton.
Minton, James, Boston.
Mitton, Edward J., Brookline.
Mixter, George, Boston.
Monteith, David, Dedham.
Montgomery, Alexander, Natick.
Moore, John H., Concord.
Morgan, George H., New York, N. Y.
Morse, John T., Jr., Boston.
Morse, Robert M., Jamaica Plain.
Moseley, Charles H., Dorchester.
Mudge, George A., Portsmouth, N. H.
Murphy, William Bowen, Boston.
Murray, Peter, Fairhaven.
Mutch, John, Brookline.

Nevins, Mrs. David, Methuen.
Newman, John R., Winchester.
Newton, Rev. William W., Pittsfield.
Nickerson, George A., Dedham.
Nickerson, Mrs. George A., Dedham.
Norton, Charles W., Allston.
Norton, Edward E , Boston.

Oakman, Hiram A., North Marshfield.
Olmsted, Frederick Law, Jr., Brookline.
Olmsted, John C., Brookline.
Orpet, Edward O., South Lancaster.

Page, Mrs. Henrietta, Boston.
Paige, Clifton H., Mattapan.
Parker, Augustus, Roxbury.
Parker, Charles W., Boston.
Parkman, Henry, Boston.
Parsons, John E., Lenox.
Partridge, Horace, North Cambridge.
Patten, Marcellus A., Tewksbury.
Paul, Alfred W., Dighton.
Peabody, Francis H., Boston.
Peabody, George A., Danvers.
Peabody, John E., Salem.
Peabody, S. Endicott, Salem.
Peck, O. H., Denver, Col.
Peck, William G , Arlington.
Peirce, Miss Marion W., Topsfield.
† Perry, George W., Malden.
Pfaff, Col. Charles, South Framingham.
Philbrick, William D., Newton Centre.
Phillips, John C., North Beverly.
Phillips, Mrs. John C., North Beverly.

Phillips, William, North Beverly.
Pierce, Dean, Brookline.
Pierce, Elisha N., Waltham.
Pierce, George Francis, Neponset.
Pond, Preston, Winchester.
Poor, John R., Brookline.
Pope, Col. Albert A., Cohasset.
Porter, Alexander S., Boston.
Porter, James C., Wollaston.
Porter, Hon. Joseph S., Washington, D. C.
Prang, Louis, Roxbury.
Pratt, Laban, Dorchester.
Pratt, Lucius G., West Newton.
Pratt, Robert M., Boston.
Prendergast, J. M., Boston.
Prescott, Eben C., New York, N. Y.
Pringle, Cyrus G., Charlotte, Vt.
Prouty, Gardner, Littleton.
Putnam, George, Manchester.
Putnam, George J., Brookline.
Putnam, Joshua H., Newton Centre.

Quinby, Hosea M., M.D., Worcester.

Raddin, Everett W., North Cambridge.
Rand, Miss Elizabeth L., Newton Highlands.
Rand, Harry S., North Cambridge.
Rand, Oliver J., Cambridgeport.
Rawson, Warren W., Arlington.
Ray, James F., Franklin.
Raymond, Walter, Boston.
Read, Charles A., Manchester.
Reardon, John B., Boston
Reed, Henry R., Jamaica Plain.
Rice, George C., Worcester.
Richards, John J., Boston.
Richardson, Charles E., Cambridge.
Richardson, Dr. William L., Boston.
Rinn, J. Ph., Boston.
Ripley, Charles, Dorchester.
Ripley, Ebed L., Hingham Centre.
Robbins, I. Gilbert, Melrose Highlands.
Robinson, John, Salem.
Robinson Joseph B , Dorchester.
Robinson, Warren J., Somerville.
Rogers, Mrs. Jacob C., Peabody.
Roland, Thomas, Nahant.
Roy, David Frank, Malden.
Ruddick, William H., M.D., South Boston.
Russell, George, Woburn.
Russell, James S., Milton.
Russell, Hon. John E., Leicester.
Russell, Walter, Arlington.

Salisbury, William C. G., Brookline.
Saltonstall, Richard M., Newton.
Sanford, Oliver S., Hyde Park.
Sanger, Mrs. George P., Boston.
Sargent, Andrew Robeson, Brookline.
Sargent, Charles S., Brookline.
Sargent, Mrs. Charles S., Brookline.
Sargent, Mrs. Francis W., Wellesley.
Sawtelle, Eli A., Boston.
Sawyer, Timothy T., Boston.
Scorgie, James C , Cambridge.
† Scott, Charles, Newton.
Sears, Miss Clara E., Boston.
Sears, Miss Emily E., Boston.
Sears, Dr. Henry F., Boston.
Sears, J. Montgomery, Boston.
Sears, Mrs. J. Montgomery, Boston.
Shaler, Nathaniel S., Cambridge.
Sharp, Miss Helen, Boston.
Shaw, Christopher C., Milford, N. H.
Shaw, Francis, Wayland.
Shaw, Mrs. Robert G., Wellesley.
Sherman, William H., Boston.
Shorey, John L., Lynn.
Shuman, Hon. A., Roxbury.
Sias, Charles D., Wenham.
Siebrecht, H. A., New Rochelle, N. Y.
Simpkins, Miss Mabel, Yarmouth.
Skinner, Francis, Boston.
Skinner, Francis, Jr., Boston.
Sleeper, Henry Davis, Boston.

Smith, Archibald, West Somerville.
Smith, Calvin W., Wellesley Hills.
Smith, Charles H., Newton Highlands.
Smith, Charles S., Lincoln.
Smith, Edward N., San Francisco, Cal.
Smith, George O., East Lexington.
Smith, Thomas Page, Waltham.
Snow, Eugene A., Melrose.
Snow, Samuel T., Cohasset.
Sohier, Col. William D., Beverly.
Souther, Charles H., Jamaica Plain.
Spaulding, Edward, West Newton.
Speare, Alden, Newton Centre.
Spooner, William H., Jamaica Plain.
Sprague, Hon. Charles F., Brookline.
Sprague, Isaac, Wellesley Hills.
Springall, George, Malden.
Stearns, Frank W., Newton.
Stedman, Henry R., M. D., Roslindale.
Stevens, Hon. Moses T., Andover.
Stewart, William J., Winchester.
Stone, Charles W., Boston.
Stone, Prof. George E., Amherst.
Stone, George F., Chestnut Hill.
Strater, Herman, Roxbury.
Strong, William C., Waban.
Swain, Charles E., Roxbury.
Sweet, Everell F., Malden.

Talbot, Mrs. I. Tisdale, Boston.
Tarbell, George G., M.D., Boston.
Taylor, Charles H., Boston.
Taylor, Horace B., Portland, Me.
Temple, Felker L., Boston.
Tenney, C. H., Methuen.
Thayer, Bayard, Lancaster.
Thayer, Mrs. Bayard, Lancaster.
Thayer, Eugene V. R., South Lancaster.
Thayer, Mrs. Eugene V. R., South Lancaster.
Thayer, John E., South Lancaster.
Thayer, Mrs. John E., South Lancaster.
Thayer, Nathaniel, Lancaster.
Thayer, Mrs. Nathaniel, Lancaster.
Thayer, S. V. R., Boston.
Thayer, Mrs. S. V. R., Boston.
Thiemann, Hermann, Manchester.
Thomas, W. B., Manchester.
Thurlow, Thomas C., West Newbury.
Tilton, Stephen W., Roxbury.
Todd, John, Hingham.
Tolman, Benjamin, Concord.
Tolman, Miss Harriet S., Boston.
Toppan, Roland W., Malden.
Torrey, Everett, Charlestown.
Tower, Miss Ellen May, Lexington.
Travis, Charles B., Brighton.
Trepess, Samuel J., Glencove, L. I., N. Y.
Tucker, Lawrence, Boston.
† Turner, John M., Dorchester.
Turner, Roswell W., Boston.

Vander-Woerd, Charles, Waltham.
Vaughan, William Warren, Boston.
Vinal, Miss Mary L., Somerville.

Wakefield, E. H., Cambridge.
Walcott, Henry P., M.D., Cambridge.
Waldo, C. Sidney, Jamaica Plain.
Wales, George O., Braintree.
Walker, Miss Mary Sophia, Waltham.
Walley, Mrs. W. P., Boston.
Walsh, Michael H., Wood's Holl.
Waltham, George C., Dorchester.
Walton, Daniel G., Wakefield.
Ward, Francis Jackson, Roxbury.
Ward, John, Newton Centre.
Ware, Benjamin P., Clifton.
Ware, Miss Mary L., Boston.
Warren, Samuel D., Dedham.
Washburn, Andrew, Hyde Hark.
Watson, Benjamin M., Jamaica Plain.

Phillips, William, North Beverly.
Pierce, Dean, Brookline.
Pierce, Elisha N., Waltham.
Pierce, George Francis, Neponset.
Pond, Preston, Winchester.
Poor, John R., Brookline.
Pope, Col. Albert A., Cohasset.
Porter, Alexander S., Boston.
Porter, James C., Wollaston.
Porter, Hon. Joseph S., Washington, D. C.
Prang, Louis, Roxbury.
Pratt, Laban, Dorchester.
Pratt, Lucius G., West Newton.
Pratt, Robert M., Boston.
Prendergast, J. M., Boston.
Prescott, Eben C., New York, N. Y.
Pringle, Cyrus G., Charlotte, Vt.
Prouty, Gardner, Littleton.
Putnam, George, Manchester.
Putnam, George J., Brookline.
Putnam, Joshua H., Newton Centre.

Quinby, Hosea M., M.D., Worcester.

Raddin, Everett W., North Cambridge.
Rand, Miss Elizabeth L., Newton Highlands.
Rand, Harry S., North Cambridge.
Rand, Oliver J., Cambridgeport.
Rawson, Warren W., Arlington.
Ray, James F., Franklin.
Raymond, Walter, Boston.
Read, Charles A., Manchester.
Reardon, John B., Boston
Reed, Henry R., Jamaica Plain.
Rice, George C., Worcester.
Richards, John J., Boston.
Richardson, Charles E., Cambridge.
Richardson, Dr. William L., Boston.
Rinn, J. Ph., Boston.
Ripley, Charles, Dorchester.
Ripley, Ebed L., Hingham Centre.
Robbins, I. Gilbert, Melrose Highlands.
Robinson, John, Salem.
Robinson Joseph B , Dorchester.
Robinson, Warren J., Somerville.
Rogers, Mrs. Jacob C., Peabody.
Roland, Thomas, Nahant.
Roy, David Frank, Malden.
Ruddick, William H., M.D., South Boston.
Russell, George, Woburn.
Russell, James S., Milton.
Russell, Hon. John E., Leicester.
Russell, Walter, Arlington.

Salisbury, William C. G., Brookline.
Saltonstall, Richard M., Newton.
Sanford, Oliver S., Hyde Park.
Sanger, Mrs. George P., Boston.
Sargent, Andrew Robeson, Brookline.
Sargent, Charles S., Brookline.
Sargent, Mrs. Charles S., Brookline.
Sargent, Mrs. Francis W., Wellesley.
Sawtelle, Eli A., Boston.
Sawyer, Timothy T., Boston.
Scorgie, James C , Cambridge.
† Scott, Charles, Newton.
Sears, Miss Clara E., Boston.
Sears, Miss Emily E., Boston.
Sears, Dr. Henry F., Boston.
Sears, J. Montgomery, Boston.
Sears, Mrs. J. Montgomery, Boston.
Shaler, Nathaniel S., Cambridge.
Sharp, Miss Helen, Boston.
Shaw, Christopher C., Milford, N. H.
Shaw, Francis, Wayland.
Shaw, Mrs. Robert G., Wellesley.
Sherman, William H., Boston.
Shorey, John L., Lynn.
Shuman, Hon. A., Roxbury.
Sias, Charles D., Wenham.
Siebrecht, H. A., New Rochelle, N. Y.
Simpkins, Miss Mabel, Yarmouth.
Skinner, Francis, Boston.
Skinner, Francis, Jr., Boston.
Sleeper, Henry Davis, Boston.

Smith, Archibald, West Somerville.
Smith, Calvin W., Wellesley Hills.
Smith, Charles H., Newton Highlands.
Smith, Charles S., Lincoln.
Smith, Edward N., San Francisco, Cal.
Smith, George O., East Lexington.
Smith, Thomas Page, Waltham.
Snow, Eugene A., Melrose.
Snow, Samuel T., Cohasset.
Sohier, Col. William D., Beverly.
Souther, Charles H., Jamaica Plain.
Spaulding, Edward, West Newton.
Speare, Alden, Newton Centre.
Spooner, William H., Jamaica Plain.
Sprague, Hon. Charles F., Brookline.
Sprague, Isaac, Wellesley Hills.
Springall, George, Malden.
Stearns, Frank W., Newton.
Stedman, Henry R., M. D., Roslindale.
Stevens, Hon. Moses T., Andover.
Stewart, William J., Winchester.
Stone, Charles W., Boston.
Stone, Prof. George E., Amherst.
Stone, George F., Chestnut Hill.
Strater, Herman, Roxbury.
Strong, William C., Waban.
Swain, Charles E., Roxbury.
Sweet, Everell F., Malden.

Talbot, Mrs. I. Tisdale, Boston.
Tarbell, George G., M.D., Boston.
Taylor, Charles H., Boston.
Taylor, Horace B., Portland, Me.
Temple, Felker L., Boston.
Tenney, C. H., Methuen.
Thayer, Bayard, Lancaster.
Thayer, Mrs. Bayard, Lancaster.
Thayer, Eugene V. R., South Lancaster.
Thayer, Mrs. Eugene V. R., South Lancaster.
Thayer, John E., South Lancaster.
Thayer, Mrs. John E., South Lancaster.
Thayer, Nathaniel, Lancaster.
Thayer, Mrs. Nathaniel, Lancaster.
Thayer, S. V. R., Boston.
Thayer, Mrs. S. V. R., Boston.
Thiemann, Hermann, Manchester.
Thomas, W. B., Manchester.
Thurlow, Thomas C., West Newbury.
Tilton, Stephen W., Roxbury.
Todd, John, Hingham.
Tolman, Benjamin, Concord.
Tolman, Miss Harriet S., Boston.
Toppan, Roland W., Malden.
Torrey, Everett, Charlestown.
Tower, Miss Ellen May, Lexington.
Travis, Charles B., Brighton.
Trepess, Samuel J., Glencove, L. I., N. Y.
Tucker, Lawrence, Boston.
† Turner, John M., Dorchester.
Turner, Roswell W., Boston.

Vander-Woerd, Charles, Waltham.
Vaughan, William Warren, Boston.
Vinal, Miss Mary L., Somerville.

Wakefield, E. H., Cambridge.
Walcott, Henry P., M.D., Cambridge.
Waldo, C. Sidney, Jamaica Plain.
Wales, George O., Braintree.
Walker, Miss Mary Sophia, Waltham.
Walley, Mrs. W. P., Boston.
Walsh, Michael H., Wood's Holl.
Waltham, George C., Dorchester.
Walton, Daniel G., Wakefield.
Ward, Francis Jackson, Roxbury.
Ward, John, Newton Centre.
Ware, Benjamin P., Clifton.
Ware, Miss Mary L., Boston.
Warren, Samuel D., Dedham.
Washburn, Andrew, Hyde Park.
Watson, Benjamin M., Jamaica Plain.

Watson, Thomas A., East Braintree.
Watts, Isaac, Waverly.
Webber, Aaron D., Boston.
Webster, Hollis, Cambridge,
Weld, Christopher Minot, Jamaica Plain.
Weld, George W., Boston.
Weld, Richard H., Boston.
Weld, Gen. Stephen M., Dedham.
West, Mrs. Maria L., Neponset.
Weston, Seth, Chelsea.
Wheeler, Frank, Concord.
Wheeler, James, Brookline.
Wheeler, Wilfred, Concord.
Wheelwright, A. C., Brookline.
Wheelwright, Edmund M., Boston.
Whitcomb, William B., Medford.
White, Francis A., Brookline.
White, George R., Boston.
White, Joseph H., Brookline.
Whitney, Arthur E., Winchester.
Whitney, Ellerton P., Milton.
Whitney, Henry M., Cohasset.
Whittier, George E., Groton.
Whittier, William Benjamin, South Framingham.
Wigglesworth, George, Milton.
Wilbur, George B., West Newton.
Wilder, Edward Baker, Dorchester.
Wilder, Henry A., Malden.
Willard, E. W., Newport, R. I.
Wilcutt, Levi L., Brookline.
Williams, Miss Adelia Coffin, Roxbury.
Williams, Benjamin B., Boston.
Williams, John Davis, Boston.
Williams, Philander, Taunton.
Willis, George W., Chelsea.
Willis, Joshua C., Roxbury.
Wilson, Col. Henry W., Boston.
Wilson, William Power, Boston.
Winthrop, Robert C., Jr., Boston.
Wood, Edmund M., Natick.
Wood, William K., West Newton.
Woods, Henry, Boston.
Wright, George C., West Acton.
Wright, John G., Brookline.
Wyman, Oliver B., Shrewsbury.
Wyman, Windsor H., North Abington.

ANNUAL MEMBERS.

Members of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

Allen, Charles L., Floral Park. N.Y.
Alles, William H., Chestnut Hill.
Anderson, George M., Milton.
Arnold, Miss Sarah L., Newton Centre.
Atkinson, Edward, Brookline.
Ayres, Miss Helen F., Medford.

Badlam, William H., Dorchester.
Barker, John G., Melrose.
Barr, John, Wellesley.
Bigelow, Arthur J., Eastlake, Worcester.
Bigelow, Mrs. Nancy J., Southborough.
Bird, John L., Dorchester.
Blomberg, Carl, North Easton.
Bock, William A., North Cambridge.
Bolles, William P., M.D., Roxbury.
Boyden, Clarence F., Taunton.
Braman, George H., Newton.
Breck, Charles H., Newton.
Brunton, Frank, Newport, R. I.
Butler, Edward, Wellesley.

Carpenter, Frank O., West Roxbury.
Carter, Mrs. Sarah D. J., Wilmington.
Cary, Miss Alice B., Lexington.
Chase, Joseph S., Malden.
Chase, Leverett M., Roxbury.
Chase, Philip A., Lynn.
Chubbuck, Isaac Y., Roxbury.
Clapp, Henry L., Roxbury.
Clark, John W., North Hadley.
Clark, Joseph, Manchester.
Clark, Theodore M., Newtonville.
Clinkaberry, Henry T., Trenton, N. J.
Coffin, Abraham B., Winchester.
Collins, Frank S., Malden.
Comley, James, Lexington.
Coolidge, David H., Jr., Boston.
Coolidge, Dr. Sumner, East Watertown.
Cotter, Lawrence, Dorchester.
Cotting, Charles U., Boston.
Crosby, J. Allen, Jamaica Plain.
Curtis, Joseph H., Boston.
Curtis, Louville, Tyngsborough.

Davis, Frederick, Boston.
Davis, Frederick S., West Roxbury.
Dawson, Charles Jackson, Newark, N. J.
Derby, William H., Revere.
Dolbear, Mrs. Alice J., College Hill.
Doran, Enoch E., Brookline.
Dorr, George B., Boston.
Doyle, William E., East Cambridge.
Duffley, Daniel, Brookline.

Eastman, Edmund C., Brookline.
Eaton, Warren E., Reading.
Endicott, Miss Charlotte M., Canton.
Eustis, William Tracy, Brookline.
Ewell, Marshall F., Marshfield Hills.

Fenno, Warren, Revere.
Fisher, Sewell, Framingham.

Fitzgerald, Desmond, Brookline.
Fletcher, Fred W., Auburndale.
Forbes, William H., Jamaica Plain.
Francis, George E., M.D., Worcester.
Frost, Varnum, Arlington.
Fuller, T. Otis, Needham.

Gibbon, Mrs. James A., Boston.
Gill, Mrs. E. M., Medford.
Gilman, Hon. Virgil C., Nashua, N. H.
Grant, Charles E., Concord.
Grew, Henry Sturgis, Boston.
Grey, Robert Melrose, North Easton.
Grey, Thomas J., Chelsea.

Hall, Charles H., M.D., Corning, Cal.
Hall, Stacy, Boston.
Hallstram, Charles W., Boston.
Ham, Fernald E., Burlington.
Hargraves, William J., Jamaica Plain.
Harris, Frederick L., Wellesley.
Harrison, C. S., York, Nebraska.
Harrison, Thomas, Melrose Highlands.
Hartwell, Samuel, Lincoln.
Hatfield, T. D., Wellesley.
Hersey, Alfred H., Hingham.
Hersey, Edmund, Hingham.
Heustis, Warren H., Belmont.
Hill, J. Willard, Belmont.
Hinds, Warren D., Townsend.
Hobbs, George M., Boston.
Hollis, George, South Weymouth.
Houghton, George S., West Newton.
Howden, Thomas, Whitinsville.
Hubbard, F. Tracey, Cambridge.
Huston, Miss Katharine W., Jamaica Plain.

Ireland, Robert D., Winthrop.

James, Robert Kent, Dorchester.
Jameson, G. W., East Lexington.

Keith, Mrs. Mary R., Washington, D. C.
Kelsey, Harlan P., Boston.
Kemp, William S., Brookline.
Kennard, Frederic H., Brookline.
Kinney, H. R., Worcester.

Lancaster, Mrs. E. M., Roxbury.
Laurie, Robert, Newport, R. I.
Lawson, Joshua, Brookline.
Lincoln, Miss Agnes W., Medford.
Lomax, George H., Somerville.
Loring, Charles G., Boston.
Loring, William C., Beverly.
Lothrop, Thornton K., Boston.
Low, Hon. Aaron, Hingham.

Manda, W. A., South Orange, N. J.
Manning, A. Chandler, Reading.
Martin, William J, Milton.
Masten, Cornelius E., Dorchester.
Maynard, Charles, North Easton.
McLaren, Anthony, Westwood.
Meriam, Horatio C., D.M.D., Salem.
Metcalf, Dr. Ben H., Winthrop.
Milman, William, Roxbury.
Moody, Abner J., Boston.
Moore, George D., Arlington.
Morgan, George M., Boston.
Morison, George Abbot, Cambridge.
Morrison, William, Cohasset.
Moseley, Frederick C., Dorchester.
Moseley, Frederick Strong, Newburyport.
Munson, Prof. W. M., Orono, Me.

Newton, John F., Roxbury.
Nicholson, William, Framingham.
Norton, Michael H., Boston.
Norton, Patrick, Dorchester.

Olmsted, Frederick Law, Brookline.

Park, William D., Boston.
Parker, John, Newtonville.
Parker, Walter S., Reading.
Patterson, William, Quincy.
Pierce, George H., Concord Junction.

Petremant, Robert, Brooklyn, N. Y.
Pettigrew, John A., Jamaica Plain.
Pickman, Dudley L., Boston.
Pierce, Mrs. F. A., Brookline.
Plimpton, Willard P., West Newton.
Pray, James Sturgis, Cambridge.
Purdie, George A., Wellesley Hills.

Rea, Charles H., Norwood.
Rea, Frederic J., Norwood.
Rich, Miss Ruth G., Dorchester.
Rich, William E. C., Roxbury.
Rich, William P., Chelsea.
Richards, Mrs. P. D., West Medford.
Robb, Peter B., Whitinsville.
Robbins, Oliver R., Weston.
Robinson, Walter A., Arlington.
Rodman, Miss Mary, Concord.
Ross, Charles W., Newtonville.
Ross, Henry Wilson, Newtonville.
Rothwell, James E., Brookline.

Sander, Charles, Brookline.
Saunders, Miss Mary T., Salem.
Scott, Augustus E., Lexington.
Scudder, Samuel H., Cambridge.
Searles, E. F., Methuen.
Seaver, Edwin P., LL.D., Waban.
Sharples, Stephen P., Cambridge.
Shaw, Hon. Edward P., Newburyport.
Shepard Harvey N., Boston.
Sheppard, Edwin, Lowell.
Southworth, Edward, Quincy.
Squire, Miss Esther A., North Cambridge.
Stearns, Mrs. Charles A., East Watertown.
Stearns, Charles H., Brookline.
Stevens, Mrs. Mary L., Cambridge.
Stevens, Miss Mary O., North Andover.
Stone, Joshua C., Watertown.
Storer, Charles, Providence, R. I.
Story, Miss Sarah W., Brighton.
Strange, David T., Stoneham.
Sullivan, Michael, Revere.
Sutherland, George A., Roslindale.
Swan, Charles W., M.D., Brookline.

Tailby, Joseph, Wellesley.
Teele, William H., West Acton.
Thatcher, William, Brookline.
Tobey, Rufus T., Roxbury
Tyndale, Theodore H., Brookline.

Vaughan, J. C., Chicago, Ill.

Warren, Samuel H., Weston.
Welch, Patrick, Dorchester.
Westwood, Thomas H., Jamaica Plain.
Wheeler, Henry A , Newtonville.
White, Maurice P , Roxbury.
White, W. Henry, Lowell.
Whitney, Joseph, Cambridgeport.
Whiton, Hon. Starkes, Hingham Centre.
Wilkie Edward A., Newtonville.
Winter, William C., Mansfield.
Wolcott, Mrs. H. L. T., Dedham.
Wood, Mrs. Anna D., West Newton.
Wood, Elijah A., West Newton.
Wood, E. W., West Newton.
Woodferd, Joseph H., Boston.
Woods, Henry F., Boston.

Young, E. Bentley, Boston.

Zirngiebel, Denys, Needham.

Fitzgerald, Desmond, Brookline.
Fletcher, Fred W., Auburndale.
Forbes, William H., Jamaica Plain.
Francis, George E., M.D., Worcester.
Frost, Varnum, Arlington.
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Grey, Thomas J., Chelsea.

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Hall, Stacy, Boston.
Hallstram, Charles W., Boston.
Ham, Fernald E., Burlington.
Hargraves, William J., Jamaica Plain.
Harris, Frederick L., Wellesley.
Harrison, C. S., York, Nebraska.
Harrison, Thomas, Melrose Highlands.
Hartwell, Samuel, Lincoln.
Hatfield, T. D., Wellesley.
Hersey, Alfred H., Hingham.
Hersey, Edmund, Hingham.
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Manning, A. Chandler, Reading.
Martin, William J, Milton.
Masten, Cornelius E., Dorchester.
Maynard, Charles, North Easton.
McLaren, Anthony, Westwood.
Meriam, Horatio C., D.M.D., Salem.
Metcalf, Dr. Ben H., Winthrop.
Milman, William, Roxbury.
Moody, Abner J., Boston.
Moore, George D., Arlington.
Morgan, George M., Boston.
Morison, George Abbot, Cambridge.
Morrison, William, Cohasset.
Moseley, Frederick C., Dorchester.
Moseley, Frederick Strong, Newburyport.
Munson, Prof. W. M., Orono, Me.

Newton, John F., Roxbury.
Nicholson, William, Framingham.
Norton, Michael H., Boston.
Norton, Patrick, Dorchester.

Olmsted, Frederick Law, Brookline.

Park, William D., Boston.
Parker, John, Newtonville.
Parker, Walter S., Reading.
Patterson, William, Quincy.
Pierce, George H., Concord Junction.

Petremant, Robert, Brooklyn, N. Y.
Pettigrew, John A., Jamaica Plain.
Pickman, Dudley L., Boston.
Pierce, Mrs. F. A., Brookline.
Plimpton, Willard P., West Newton.
Pray, James Sturgis, Cambridge.
Purdie, George A., Wellesley Hills.

Rea, Charles H., Norwood.
Rea, Frederic J., Norwood.
Rich, Miss Ruth G., Dorchester.
Rich, William E. C., Roxbury.
Rich, William P., Chelsea.
Richards, Mrs. P. D., West Medford.
Robb, Peter B., Whitinsville.
Robbins, Oliver R., Weston.
Robinson, Walter A., Arlington.
Rodman, Miss Mary, Concord.
Ross, Charles W., Newtonville.
Ross, Henry Wilson, Newtonville.
Rothwell, James E., Brookline.

Sander, Charles, Brookline.
Saunders, Miss Mary T., Salem.
Scott, Augustus E., Lexington.
Scudder, Samuel H., Cambridge.
Searles, E. F., Methuen.
Seaver, Edwin P., LL.D., Waban.
Sharples, Stephen P., Cambridge.
Shaw, Hon. Edward P., Newburyport.
Shepard Harvey N., Boston.
Sheppard, Edwin, Lowell.
Southworth, Edward, Quincy.
Squire, Miss Esther A., North Cambridge.
Stearns, Mrs. Charles A., East Watertown.
Stearns, Charles H., Brookline.
Stevens, Mrs. Mary L., Cambridge.
Stevens, Miss Mary O., North Andover.
Stone, Joshua C., Watertown.
Storer, Charles, Providence, R. I.
Story, Miss Sarah W., Brighton.
Strange, David T., Stoneham.
Sullivan, Michael, Revere.
Sutherland, George A., Roslindale.
Swan, Charles W., M.D., Brookline.

Tailby, Joseph, Wellesley.
Teele, William H., West Acton.
Thatcher, William, Brookline.
Tobey, Rufus T., Roxbury
Tyndale, Theodore H., Brookline.

Vaughan, J. C., Chicago, Ill.

Warren, Samuel H., Weston.
Welch, Patrick, Dorchester.
Westwood, Thomas H., Jamaica Plain.
Wheeler, Henry A , Newtonville.
White, Maurice P , Roxbury.
White, W. Henry, Lowell.
Whitney, Joseph, Cambridgeport.
Whiton, Hon. Starkes, Hingham Centre.
Wilkie Edward A., Newtonville.
Winter, William C., Mansfield.
Wolcott, Mrs. H. L. T., Dedham.
Wood, Mrs. Anna D., West Newton.
Wood, Elijah A., West Newton.
Wood, E. W., West Newton.
Woodford, Joseph H., Boston.
Woods, Henry F., Boston.

Young, E. Bentley, Boston.

Zirngiebel, Denys, Needham.

EXTRACTS FROM THE CONSTITUTION AND BY-LAWS.

SECTION XXII.

Life Members.

The payment of thirty dollars shall constitute a Life Membership, and exempt the member from all future assessments, and any Annual Member, having paid all dues, may become a Life Member by the payment of twenty dollars in addition thereto.

Annual Membership.

Every Annual Member, before he receives his diploma, or exercises the privileges of a member, shall pay the sum of ten dollars as an admission fee, and shall be subject afterwards to an annual assessment of two dollars.

SECTION XXIII.

Withdrawal or Discontinuance of Membership.

Any member may withdraw from the Society, on giving notice to the Treasurer and paying the amount due from him Any member who shall neglect for the space of two years to pay his annual assessment, after due notice from the Treasurer, shall cease to be a member. The Treasurer shall give notice of such withdrawals, or discontinuances to the Secretary, who shall erase such members' names from the list.

The attention of Annual Members is particularly called to Section XXIII.

HONORARY MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor. by promptly communicating to the Secretary the needed corrections.

Information, or any clew to it, is especially desired in regard to Joseph Maxwell, *elected in* 1830, *and* George W. Smith, *elected in* 1851.

Hon. George S. Boutwell, Groton.

Clarence H. Clark, Ex-President of the Pennsylvania Horticultural Society, Philadelphia.

Joseph Jefferson, Buzzard's Bay.

Major L. A. Huguet-Latour, M. P., Montreal, Canada.

Sir Trevor Lawrence, President of the Royal Horticultural Society, London.

Joseph Maxwell, Rio Janeiro, Brazil.

Donald G. Mitchell, New Haven, Conn.

Hon. J. Sterling Morton, Ex-Secretary of Agriculture, Nebraska City, Neb.

Baron R. Von Osten Sacken, Heidelberg, Germany.

Samuel B. Parsons, Flushing, N. Y.

Dr. Henry S. Pritchett, President of the Massachusetts Institute of Technology, Boston.

George W. Smith, Boston.

Albert Viger, President of the National Society of Horticulture of France, Paris.

Hon. James Wilson, Secretary of Agriculture, Washington, D. C.

CORRESPONDING MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly reporting to the Secretary the needed corrections.

Information, or any clew to it, is especially desired in regard to Alexander Burton, *elected in* 1829; S. Reynolds, M.D., 1832; *and* Francis Summerest (or Summerer), 1833.

Édouard André, Editor-in-chief of the Revue Horticole, Paris, France.

Professor L. H. Bailey, Horticultural Department, Cornell University, Ithaca, N. Y.

John Gilbert Baker, F. R. S., F. L. S., Kew, England.

Charles Baltet, Président de la Société Horticole, Vigneronne, et Forestière de l' Aube, Troyes, France.

Peter Barr, London, England.

Archibald F. Barron, Turnham Green, London, W.

Napoleon Baumann, Bolwiller, Alsace.

D. W. Beadle, 303 Crawford St., Toronto, Ontario.

Professor William J. Beal, Agricultural College, Michigan.

Prosper J. Berckmans, Ex-President of the American Pomological Society, Augusta, Ga.

Charles E. Bessey, Ph. D., Professor of Botany in the Industrial College of the University of Nebraska, Lincoln.

Dr. Ch. Bolle, Berlin, Prussia.

Col. Gustavus B. Brackett, Pomologist to the United States Department of Agriculture, Washington, D. C.

John Croumbie Brown, LL.D., Haddington, Scotland.

Professor J. L. Budd, Ames, Iowa.

William Bull, Chelsea, England.

F. W. Burbidge, M.A., Trinity College Botanic Garden, Dublin, Ireland.

Alexander Burton, United States Consul at Cadiz, Spain, Philadelphia.

Maxime Cornu, Director of the Jardin des Plantes, Paris, France.

Daniel T. Curtis, Dorchester.

Rev. H. Honywood D'Ombrain, Westwell Vicarage, Ashford, Kent, England.

Sir W. T. Thiselton Dyer, K. C. M. G., F. R. S., Director of the Royal Botanic Gardens, Kew, England.

PARKER EARLE, President of the American Horticultural Society, Roswell, N. M.

GEORGE ELLWANGER, Rochester, N. Y.

HENRY JOHN ELWES, F. L. S., F. Z. S., Colesborn, Andoversford, Gloucestershire, England.

WILLIAM G. FARLOW, M.D., Professor of Cryptogamic Botany, Harvard University.

B. E. FERNOW, Forestry School, Cornell University, Ithaca, N. Y.

HON. ROBERT W. FURNAS, Ex-President of the Nebraska State Horticultural Society, Brownville.

BEVERLY T. GALLOWAY, Horticulturist and Superintendent of Gardens and Grounds of the United States Department of Agriculture, Washington, D.C.

CHARLES A. GOESSMANN, Ph.D., LL.D., Chemist of the Hatch Experiment Station of the Massachusetts Agricultural College, Amherst.

GEORGE L. GOODALE, M.D., Professor of Botany, Harvard University, Cambridge.

HENRY H. GOODELL, President of the Massachusetts Agricultural College, Amherst.

OBADIAH B. HADWEN, President of the Worcester County Horticultural Society, Worcester.

PROFESSOR BYRON D. HALSTED, Botanist and Horticulturist at the New Jersey Agricultural Experiment Station, New Brunswick, N. J.

PROFESSOR CARL HANSEN, of the Royal College of Agriculture, Copenhagen, Denmark.

J. H. HART, Superintendent of the Botanic Garden, Trinidad.

DR. F. M. HEXAMER, Editor of the American Agriculturist, New York.

J. W. HOFFMANN, Colored State University, Orangeburg, S. C.

J. C. HOLDING, Ex-Treasurer and Secretary of the Cape of Good Hope Agricultural Society, Cape Town, Africa.

THE VERY REV. S. REYNOLDS HOLE, D.D., Dean of Rochester, Rochester, England.

SIR JOSEPH HOOKER, K.C.S.I., The Camp, Sunningdale, England.

JOSIAH HOOPES, West Chester, Pa.

GEORGE HUSMANN, Napa, Cal.

CHARLES JOLY, Honorary Vice-President of the Société Nationale d'Horticulture de France, Paris.

SIR GEORGE KING, K. C. I. E., M. B., LL. D., F. R. S., Calcutta.

PROFESSOR WILLIAM R. LAZENBY, Department of Horticulture and Forestry; Secretary College of Agriculture and Domestic Science, Ohio State University, Columbus, O.

MAX LEICHTLIN, Baden-Baden, Germany.

VICTOR LEMOINE, Nancy, France.

DR. PETER MACOWAN, Director of the Botanic Garden, Cape Town, Africa.

DR. MAXWELL T. MASTERS, Editor of the Gardeners' Chronicle, London.

GEORGE MAW, Benthal, Kinley, Surrey, England.

T. C. MAXWELL, Geneva, N. Y.

THOMAS MEEHAN, Germantown, Pa.

DR. CHARLES MOHR, Mobile, Ala.

F. W. MOORE, A. L. S., Curator of the Royal Botanic Gardens, Glasnevin, Dublin, Ireland.

DR. DANIEL MORRIS, C.M G , D.Sc., M.A., F.L.S , Imperial Department of Agriculture, Barbados.

GEORGE NICHOLSON, Curator of the Royal Gardens, Kew, England.

PETER NØVIK, Secretary of the Norwegian Horticultural Society, Christiania.

WILLIAM PAUL, Waltham Cross, London, N.

PROFESSOR D. P. PENHALLOW, Director of the Botanic Garden, Montreal, Canada.

HENRY PROBASCO, Cincinnati, Ohio.

P. T. QUINN, Newark, N. J.

CAVALIÈRE ENRICO RAGUSA, Palermo, Sicily.

D. REDMOND, St. Nicholas, Florida.

S. REYNOLDS, M.D., Schenectady, N. Y.

BENJAMIN LINCOLN ROBINSON, Ph.D., Curator of the Gray Herbarium of Harvard University, Cambridge.

WILLIAM ROBINSON, Editor of Gardening Illustrated, London.

WILLIAM SALWAY, Superintendent of Spring Grove Cemetery, Cincinnati, O.

EDGAR SANDERS, Chicago, Ill.

WILLIAM R. SMITH, Superintendent of the Botanic Garden, Washington, D. C.

ROBERT W. STARR, Port William, N. S.

DR. JOSEPH STAYMAN, Leavenworth, Kan.

FRANCIS SUMMEREST.

WILLIAM TRELEASE, Director of the Missouri Botanic Garden, St. Louis.

DR. MELCHIOR TREUB, Director of the Botanic Garden, Buitenzorg, Java.

H. J. VEITCH, Chelsea, England.

WILLIAM WATSON, Assistant Curator of the Royal Gardens, Kew, England.

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TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1900.

PART II.

BOSTON:
PRINTED FOR THE SOCIETY.
1901.

☞ SEE LAST PAGE OF COVER.

EXPERIMENT STATION REPORTS WANTED.

The Massachusetts Horticultural Society is endeavoring to collect complete sets of the Bulletins and other publications of all the Agricultural Experiment Stations in the United States and Canada. Those named below are wanting, and any person having a spare copy will confer a favor by addressing the Librarian of the Society, Horticultural Hall, No. 101 Tremont Street, Boston.

Alabama (Ag. and Mech. College Station).—Bulletins 4-6 (1884), 7-10 and 1-4 (1885), and 5-9 (1886). 7th Annual Report, for 1894, and 9th, for 1896.

Alabama (Canebrake Station).—All Bulletins later than 18, and all Annual Reports later than the 3d, for 1890.

Arizona.—4th Annual Report, for 1893.

Arkansas.—Bulletin 1. All Annual Reports later than the 4th, for 1891, except the 8th, for 1895.

California—Bulletins 32, 1878, and 1, 2, 3, 5, and 50, New Series.

Colorado.—Bulletin 3.

Connecticut (New Haven Station).—Bulletins 1 to 67, inclusive. Annual Reports for 1877 and 1879 to 1883, inclusive.

Florida.—Annual Report for 1892.

Indiana.—(Purdue Univ. School of Ag.).—Bulletin 1. College Reports 1 to 14, inclusive

Kentucky.—Bulletin 10.

Michigan.—Special Bulletins 1, 3, and 5. 6th Annual Report, for 1897-93 (contained in Report of Michigan Board of Agriculture, 1893).

Missouri.—Bulletins 9, 13, 15, 16, 19, 20, 25, and 26 of Old Series. All Annual Reports since the 1st, for 1888, except those for 1896 to 1898, inclusive.

New Jersey.—Bulletins 1, 4, 5, 15, 27, and 28.

New Mexico.—Eighth College Catalogue, 1897-98.

New York (Cornell).—1st Annual Report, 1881-82, and all between that and 1888, except the 2nd, for 1882-83 (Reports of Agricultural Department of Cornell University.)

North Carolina.—Bulletins 1 to 56, inclusive, and 69, 2d ed. 1st to 7th Biennial Reports. Meteorological Division, Bulletin 2 (C85). Special Bulletins 1 (77*a*) and 4 (82*a*). Weekly Weather Crop Bulletins 1-21, 1888; 1-24, 1889; 1-25, 1890; 2 and 4, 1891.

North Dakota.—4th Annual Report, for 1893.

Ohio.—All Bulletins of First Series, except 16, 17, 18, and 19.

Oklahoma.—All Annual Reports previous to that for 1896-97, except that for 1893-94.

Pennsylvania.—Annual Reports for 1869, 1872, 1879-80, 1881, 1882, 1883, and 1884. [All issued by the State College.] Bulletin of Information No. 1.

South Carolina.—All Bulletins of the Old Series (previous to 1888) on the work of the Experimental Farm of the South Carolina College. 3d Annual Report, for 1890, and 6th, for 1893.

Texas.—College Bulletins 1-5, 1883-1887.

Virginia.—10th Annual Report, for 1898-99.

Washington.—6th, 7th, and 8th Annual Reports, for 1895-96, 1896-97, and 1897-98. All Bulletins later than 27.

West Virginia.—Special Bulletin—Potash and Paying Crops, 1890.

Wyoming.—Bulletins 2 to 4, 9, and 10.

Ontario Department of Agriculture, Toronto:—Bureau of Industries.—Agricultural Returns to the Ontario Bureau of Industries, Nov. 1882 (5th), Aug. 1883 (7th), and Nov. 1887 (20th).